THE OIL WEEKLY

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Oil Man's Calendar

Dec. 2-3	**Joint Annual Meeting, Standard Committees of General Mid-Continent Oil and Gas Association on Federal Income and Excise Taxation and on State and Local Taxation, Baker Hotel, Dallas, Texas.**
4	**West Central Texas Oil & Gas Association, Annual Meeting, Abilene, Texas.**
6-10	**American Society of Mechanical Engineers, New York.**
14	**Mid-Continent Oil and Gas Association, Annual Meeting of General Board of Directors, Tulsa, Okla.**
14	**East Texas Chapter, American Petroleum Institute, Kilgore, Texas.**
28-30	**American Chemical Society, Organic Division, Richmond, Va.**
1938 Jan. 24-25	**Northwest Petroleum Association, Minot, North Dakota.**
Feb. 14-18	**American Institute of Mining and Metallurgical Engineers, Annual Meeting, New York.**
Mar. 16-18	**Annual Meeting, American Association of Petroleum Geologists, Roosevelt Hotel, New Orleans, La.**
24-25	**Southwestern District, A.P.I., Division of Production, Spring Meeting, Blackstone Hotel, Fort Worth, Texas.**

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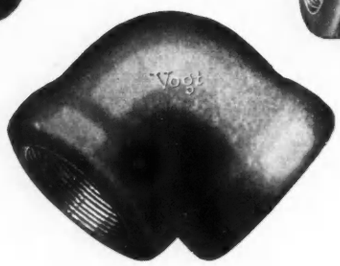

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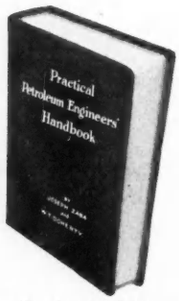

By **JOSEPH ZABA, C. M. M. Sc.**
Petroleum Engineer, Rio Bravo Oil Company
and
W. T. DOHERTY
Division Superintendent, Humble Oil & Refining Company

For a number of years there has been a growing demand for a handbook containing formulae and other practical information for the benefit of the man working in the production and drilling branches of the oil industry. So great has been this need that many engineers have tried to accumulate their own handbooks by clipping tables, formulae and figures from scores of sources.

The co-authors of this volume discovered by coincidence that each had been for a period of several years accumulating practical data which through their collaboration appears in this book. Both of them are men who have not only received theoretical training but who have had many years of practical experience as engineers in dealing with every day oil field drilling and production problems.

As a result of this collaboration of effort the publishers of this volume feel that it is a most valuable contribution to oil trade literature.

Its purposes are distinctly practical. The tables, formulae, and figures shown are practical rather than theoretical in nature. It should save the time of many a busy operator, engineer, superintendent, and foreman.

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LOOKING AHEAD

WITH THE EDITOR

Acid Treatment in South Texas . .
Torrey's Water-Flooding Series . .
Paraffin Troubles in Texas Panhandle Are Overcome . . .

MANY a geologist sat at his feet as a disciple long enough to merit on his sheepskin the signature of F. B. Plummer, head of the geological department of the University of Texas. Those, as well as others who are familiar with his contributions to the lore of geological knowledge, will look forward with pleasure to publication in an early issue of THE OIL WEEKLY of Dr. Plummer's "Acid Treatment of Oil Sands in South Texas," knowing that it, like his previous papers, will constitute a distinct contribution. You will want to know what he says about increasing the oil flow without increasing the water production too much.

PAUL TORREY got off to a flying start in Part I of "Water-Flooding of Oil Sands" in this issue. It deals with the history of water-flooding and gives an introduction to the remainder of the paper which attempts to make specific suggestions for those of you contemplating water-flooding. Part II, scheduled for Publication in the December 6 issue of THE OIL WEEKLY, *will deal with geologic factors affecting the successful application of water-flooding. The remaining parts will follow soon.*

PARAFFIN is one of the dilemmas of the Texas Panhandle producer. But he hasn't a corner on the market by a long shot. Other areas yield the troublesome wax along with oil, too. Some of the means of combating paraffin troubles involve holding back pressure against the tubing of a pumping well and development of back pressure control. These will be discussed in an article scheduled for early publication.

The changing panorama

this week

THE pressure that lately has been bearing down heavily on the oil industry's markets finally has eased somewhat, at least temporarily.

Fears of an immediate rupture of the crude price structure have been momentarily allayed by promulgation of exceptionally strict production allowables for December and by the halt last week in the downward trend of gasoline prices.

Developments Generate Hopefulness

The strict allowables indicate that the crude market will not be burdened in December with any excess production; that there may occur, in fact, some withdrawing of crude from storage.

The gasoline market some weeks ago already had declined below nearly all expectations, and hopefulness regarding future trends has been largely destroyed. Consequently, few are left who have the temerity to contend gasoline prices henceforth will be steady or improve.

Nevertheless, the sharp decline of gasoline wholesale and retail prices that had been under way steadily for two months finally was arrested last week, as prices held in most instances around the same levels as in the previous week.

Maybe it is too much to hope that the gasoline prices are dragging bottom. But the resistance that finally has developed is mildly encouraging.

Market Situation Unsettled

The seriousness of the present weakness of the gasoline market is evident when it is considered that tank car prices have declined from ½ to 1 cent a gallon on the various grades in October and November, the maximum declines having been around 20 percent; making quotations somewhat lower now than at this time last year. While refiners thus receive less for their refined products, they must pay about 10 percent more for crude oil than at this time last year, the crude postings having remained unchanged since they were raised 10 percent early this year.

It seems probable that before long, perhaps shortly after the beginning of the new year, this distorted relation between crude prices and refined product prices must be corrected, either by betterment of the product prices or by compensating lowering of crude prices.

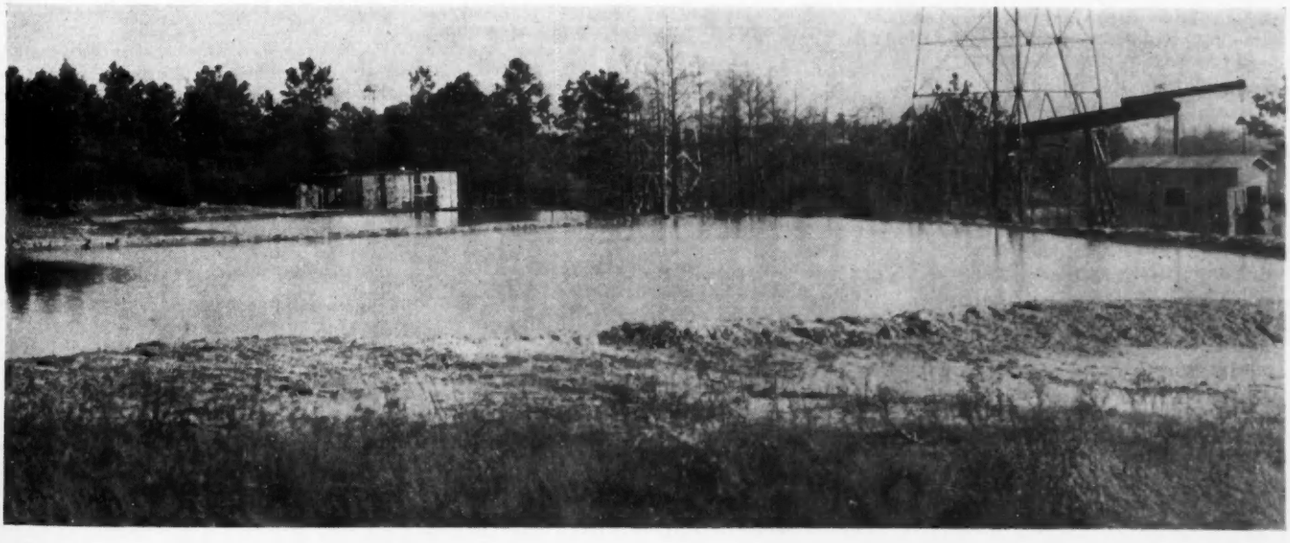
Present strict control of crude production offers the promise that the crude market may hold its ground and pull the gasoline market back up to its level. But the gasoline market has developed so much momentum in its steady decline that it may yet drag the crude market down to some extent.

It seems probable, however, that the market situation will remain largely in its present status until the end of the year.

Madison Defendants Exonerated

The ranks of defendants in the famous Madison trial have further thinned, as 3 corporations and 4 individuals last week succeeded in obtaining directed verdicts of acquittal. Previously, several companies and individuals were exonerated when the federal government decided its evidence was too

Increased water production is causing a growth in evaporation pits for handling the saline fluid in the East Texas field. Here is one large pit on the west side of the field, where they are more numerous. An interesting story on the general physical condition of the most important field in the world appears in this issue.



weak and dropped the charges against those defendants.

Those still on trial include 16 corporations and 41 individuals, but some of them yet may be granted directed verdicts of acquittal.

Oil Workers On Strike

Although declining business trends are expected to discourage friction between labor and employers, the unrest of labor in the oil industry still smoulders.

Three strikes were in progress last week. Most important was that at the Houston refinery of Shell Petroleum Corporation, where the working force of about 1200 was idle, as the C.I.O. union representing 900 of the employees negotiated with the company management.

The Houston plant had been running around 75,000 barrels of crude oil daily to stills, with trunk pipelines feeding in crude oil from the West Texas-New Mexico and East Texas-Rodessa districts.

Closing down of the Houston refinery through the strike made it necessary to divert the 75,000 barrels of crude oil daily to storage. And since available storage space is scarce in those inland sources of supply as well as on the Gulf Coast, it was generally assumed that any material delay in settling the strike might force the Shell company to greatly curtail or discontinue purchases from its field connections.

It was obvious that this situation embodied not only serious difficulties for the oil company but also hazards for the C.I.O. oil unions. For if well owners and labor in the oil fields should feel the pinch brought about by the closing of the refinery, the standing of the C.I.O. in production circles might be affected adversely.

The two other strikes still in progress last week were that of the refinery workers of Shoreline Oil Company near Shreveport, Louisiana, involving about 150 employees, and the long drawn out strike of about 25 employees of W. B. Pine, independent producer, in the Seminole area, Oklahoma.

Drilling

SHALLOW production of 150 barrels daily from a wildcat added a new field to the rapidly growing list in Illinois. The strike is about 2½ miles northwest of Centralia in Clinton County. Several other important wildcats in the state were dry.

If it can be developed economically, there appears to be a new field a mile off the South Louisiana Coast in the Gulf of Mexico. Another new field was indicated for the district in Quarantine Bay, where a test was washing in.

Although drilling deeper, a wildcat on McFaddin Ranch in the Texas Gulf Coast made a drill stem test during the week which indicated a new field.

North Louisiana was highlighted by a three-quarter mile east extension of basal Glen Rose production in Lisbon field.

In North Texas continued invasion of the K-M-A deep oil area in Wichita County is boosting lease prices to record levels; 200 acres brought $250,000 cash and $250,000 in oil.

Bohago field and the Yoakum County part of Wasson field in West Texas got important extensions, and Pecos County lease and royalty trading continues heavy.

A wildcat in the Ochiltree County section of the Texas Panhandle is reported to have logged saturation in lime at 5397-5407 feet.

Lance Creek in Wyoming is completing its first double-sand producer; oil will be taken from the Sundance and Minnelusa, a development which may lead to a revival of activity there.

Oklahoma recorded an extension of West Fitts and an indicated extension of Cement pool. In southeastern Logan county preparations were being made to core a wildcat which has already reported interesting showings.

Pawnee Rock, Pawnee County, may be a new field for Kansas, based on developments in a wildcat drilling there. Two important wildcats, one in Reno and the other in Sedgwick County, were preparing for production tests. Letsch pool of Russell County was extended.

Market briefs

Outlook—Steadier markets offer encouragement.

Crude Markets—Prices holding generally at established levels.

Refined Oil Markets—Gasoline market decline arrested.

CURRENT OPERATIONS

Week Ended	Daily Crude Production	Daily Crude Runs to Stills
November 20	3,573,850	3,365,000
Previous week	3,541,450	3,335,000
Year ago	3,060,950	2,995,000

CRUDE STOCKS

Date	Crude Oil (Barrels)
November 13	305,608,000
Week ago	307,224,000
Year ago	289,964,000

REFINED OIL STOCKS

Date	Gasoline (Barrels)	Gas & Fuel Oil (Barrels)
November 20	67,661,000	121,191,000
Week ago	67,035,000	121,012,000
Year ago	56,670,000	111,762,000

DRILLING

Period	Wells Completed
Past week	568
Previous week	633
Year ago	501
Year Total:	
This year	26,798
Last year	22,026

Technology

IN this issue, page 19, commences the first of a series of comprehensive and yet simply expressed articles on water-flooding. It is written by Paul D. Torrey, who has had many years of experience in this work.

Recent pressure declines and accelerated water intrusion in the East Texas field indicates that the world's greatest discovery is at last feeling its age. These changes, as explained on page 22, are bringing problems of salt water disposal, well remedial work and pumping to the foreground in the district.

Much attention has been focussed recently on the relationship of unnecessary drilling to production rates, but what of the legal restraints on drilling and production? This is the subject of Northcutt Ely, prominent oil industry attorney, on page 28.

Discoverers of seismic-electric correlation are believed to have found a new effect in possible geophysical applications. Studies are only beginning, so we happily presented Dr. A. Belluigi's ideas on page 38.

A study of well shooting has taught that an effective shot means more than placing a certain amount of explosives against the sand face. To be most profitable, the force of the shot must be forced as far back as possible into the body of sand. Operators have found that the loading of explosives into wells under pressure is beneficial, states F. R. Cozzens in an interesting short article on page 44.

Maintenance of gas distribution systems is an ever-existing problem. The methods found helpful and practical by one large distributing company are described and illustrated on page 46.

A bleed-off arrangement, which permits a slow rate of release, and which has proved highly effective in combatting gas lock conditions in pumping wells is dsecribed on page 17.

Proration Picture

State allowables for December conform closely with Bureau suggestions, indicating production will be held in balance with market demands.

CONTINUED effective balancing of crude oil production with market demand is promised for December, as allowables of the leading producing states for the month will remain, in the aggregate, well in line with indicated market demand, as forecast by the Bureau of Mines.

In fact, the allowables of three of the leading producing states are smaller than the federal bureau's estimates, the three including Texas, Oklahoma, and Kansas. Two others among the top six producing states, California and New Mexico, exactly followed the Bureau of Mines recommendations in November, and consequently were expected to do likewise in December if not follow the example of the other four states in cutting below the bureau's demand estimate. Louisiana proposes to continue, as in November, to slightly exceed the Bureau of Mines recommendation.

December Allowables Strict

The new state allowables indicate that December will brin ga somewhat stricter program of crude control than did November. And in November, the allowables were sufficiently low to bring about some withdrawal of crude oil from storage. It seems likely, therefore, that in December, likewise, crude production will be held not only within market requirements but actually below the current demand. Thus. further withdrawals of crude from storage in December are indicated.

In tabular form, the new allowables compare as follows with Bureau of Mines estimates of demand:

State	Bureau of Mines Estimate of Demand	State Allowable Daily in December
Texas	1,399,800	[A]1,354,143
Oklahoma	588,800	[B]560,000
Kansas	186,000	176,700
Louisiana	244,000	253,975
California	679,400	[C]
New Mexico	104,100	[C]

[A] Allowable as of November 16. Completions in latter half of month increased allowable nearer Bureau of Mines December demand estimate as month progressed.

[B] Advance indications pointed to adoption of allowable of either 550,000 or 560,000 barrels daily.

[C] California and New Mexico expected to stay within, if not cut below, Bureau of Mines recommendation.

Louisiana gets increase

North Louisiana's daily oil allowable for December was left at 82,500 barrels, the same figure as for November, but South Louisiana was given an 825-barrel increase to 171,475 barrels. This gave the entire state an allowable of 253,975 barrels daily, which is 9975 barrels more than the Bureau of Mines estimate of market demand for the month.

The allowables for Rodessa, Lisbon and Sligo were left unchanged, being 50,000 barrels, 10,000 barrels, and 600 barrels, respectively.

However, the lower Marine 8100-foot Cotton Valley field, Webster Parish, classed as a gas field although the gas carries large quantities of distillate, was given an increased gas allowable of 9,000,000 cubic feet daily to 44,000,000 feet for December. Of this three-fourths is to acreage and one-fourth to bottom hole pressures, with 1720 acres allocated to production in this horizon.

The area alloted to oil wells at Rodessa is 8,009.2 acres. The augmented daily field allowable is 66,000 barrels, the acreage factor in computing per well allowables being 4.1203 barrels per acre and the bottom hole pressure factor is 0.0644 barrels per pound. Total bottom-hole pressure for the Louisiana side of Rodessa as taken from the conservation commission's contour map as of November 1 is 512,648 pounds.

The area alloted to oil wells at Lisbon is 2,872.3 acres and the total bottom hole pressure for that field was given as 176,605 pounds. The acreage factor is 2.61115 barrels per acre and the bottom hole pressure factor is 0.01416 barrels per pound. The field allowable allocated three fourths to acreage and one fourth to bottom hole pressures.

The Sligo field, Bossier Parish, which has six oil wells, was given a daily allowable of 600 barrels and an augmented field allowable of 2000 barrels, but corrections for high gas-oil ratios materially reduces the per well allowables.

Kansas under demand

The daily allowable for Kansas in December was set at 176,700 barrels for December by the Kansas Corporation Commission.

The figure selected is a reduction of 3515 barrels below the allowable for November. The announcement by the commission was that the amount represents a reduction of 5 percent below the figure recommended by the United States Bureau of Mines.

TEXAS ALLOWABLE WAS CUT 68,886 BARRELS

When the Texas Railroad Commission ordered the state's daily crude output held to 1,354,143 barrels effective November 16, a cut of 68,886 barrels was instituted as compared with the allowable on November 12. In The OIL WEEKLY of November 22 it was stated this represented a slash of 6886 barrels, one of the digits having been omitted.

These figures do not take into consideration the Sunday shut down order for the East Texas field, which is expected to result in an additional average of 64,700 barrels being eliminated each day. This makes the Texas cut total 133,586 barrels daily.

Oklahoma cut proposed

Daily allowable of 560,000 barrels for December was recommended to the Oklahoma Corporation Commission November 26 by W. J. Armstrong, chief conservation officer. At the same time producers and purchasers were given the proposition of reducing the allowable of the Wilcox zone at Oklahoma City by 10,000 barrels.

At 560,000 barrels daily the December allowable would be 15,000 barrels below the allowable for November. Adoption of the reduction at Oklahoma City would set the December allowable at 550,000 barrels, 25,000 barrels below the allowable for November.

Recommended output for Oklahoma in December by the United States Bureau of Mines is 588,800 barrels daily. The reason given for recommending a figure lower than that calculated by the federal bureau was:

"This cut of 28,800 barrels we are recommending we believe to be nearer the actual market demand in Oklahoma for December than that of the Bureau of Mines estimate due to the over-production in this state and other states for the first part of the year."

In order to reach the 560,000 barrels daily Class B fields would be reduced 5025 barrels below the November total, 3841 would be taken from Class C pools, 2325 from Class D pools, 700 barrels from prorated but unclassified areas and 3109 from the unprorated fields.

Within the Class B group, 2500 barrels would be taken from the Edmond field, leaving 2525 barrels to be taken from the Greater Seminole area. The full reduction of Class C pools would come by reducing daily output of Hunton lime wells at Fitts 3841 barrels below their November allowable. Cromwell sand wells at Fitts would account for 1500 barrels of the 2325 to be taken from fields of Class D rating. In the prorated but unclassified group, 200 barrels daily would be taken from West Chandler and 500 barrels daily from the Simpson sand at Oklahoma City. A reduction of 3109 barrels daily in the unprorated areas would bring their daily output down to 161,891 barrels in December against a November allowable of 165,000 barrels.

Other matters considered at the hearing were methods for taking potentials in Oklahoma City Wilcox sand wells for the period from January 1 to July 1, 1938, reclassification of the Crescent pool, Logan County, into Class B from Class C.

Arkansas postpones again

The effective date of the proration order for the Arkansas end of Rodessa, which now has 46 producing wells, was again delayed last week by the Arkansas Board of Conservation until January 1, 1938. Previously the effective date had been set for November 1, then postponed to November 16 and later to December 1.

For the week ending November 17 the daily average in Miller County

dropped to 298 barrels per well for the 42 wells producing on that date. This represented a per well decline of 54 percent for on October 18 there were 25 wells with a per-well average of 544 barrels. Not all of this can be attributed to normal decline for some of the drop is due to completion of small edge wells.

Rocky Mountain area may have first state proration

For the first time in its history, the Rock Mountain oil division is threatened with state proration. Though for years operating companies have held production in line with demand through voluntary action in the various important fields, Montana, it appears, may have state proration.

Following two crude cuts which have dropped the price of the Kevin-Sunburst crude 30 cents to 90 cents a barrel and led to a flat posting of $1.10 per barrel in Cut Bank, and in view of a large over-supply of northern Montana crude oil through loss of Canadian markets, the Montana Oil Conservation board has called a meeting of operators in Great Falls November 29.

The meeting was called following a letter from Governor Roy E. Ayers telling the board that he had received numerous complaints from northern Montana oil operators with reference to the crude oil market condition of Cut Bank and Kevin-Sunburst. The meeting will discuss the advisability of proration. Opinion is about equally divided among Cut Bank and Kevin operators for and against state proration.

Old Ocean regulations

The Texas Railroad Commission last week issued rules governing production in the Old Ocean field, Brazoria County.

The regulations require 40-acre spacing. This will require wells to be located 660 feet from lease lines and 1320 feet apart.

The well fittings are to be of 10,000-pound test, to handle the heavy pressures.

Three strings of casings will be required, which includes a conductor string set at least 1400 feet below the surface and cemented to the surface. An intermediate string 6500 feet long is required, which must be set with 250 sacks of cement. The oil string must be set with 400 sacks of cement.

Another unusual regulation which the commission required was the installation of a 6000-pound test back-pressure valve above the kelly joint after drilling operations are begun below the intermediate string of casing.

40-acre spacing for Stroud gas field

Petition of Ross Oil Company for 40-acre well-spacing in the newly opened Stroud gas field of Lincoln County was granted last week by the Oklahoma Corporation Commission. The field is located in Sections 22, 23, 26 and 27-15n-6e. Initial producer, located in Section 22, received a potential of 3,500,000 cubic feet of gas daily.

Oil in the Courts

Defendants in trust trial reduced to 16 firms and 41 individuals, as seven dismissed by directed verdict.

THE list of corporate and individual defendants on trial at Madison, Wisconsin, in the government's "oil price conspiracy" case, which opened eight weeks ago, was reduced still more last week when Federal Judge Patrick T. Stone granted directed verdict motions for acquittal of 3 corporations and 4 individuals. Sixteen corporations and 41 individuals remain to face the charges when court sessions are resumed Monday morning after a Thanksgiving Day holiday, but directed verdict motions may yet be granted for some of these.

Those acquitted last week were Gulf Oil Corporation, Gulf Refining Company, The Texas Company, and four officers of the latter corporation: W. S. S. Rodgers, New York, president; R. D. Cottingham, New York, assistant to the president; H. W. Dodge, New York, vice president in charge of sales, and P. C. Scullin, Houston, vice president and general manager of Indian Refining Company, a Texas Company subsidiary.

The action was the second move in as many weeks which brought freedom to some of the defendants originally indicted by a federal grand jury over 16 months ago. On November 11, government motions for dismissal of charges against 4 corporations, 3 trade journals and 1 individual was granted by the court.

Judge Stone, in adjourning court for the holiday, said evidence against some of the remaining 41 individual defendants has given him "some concern," and that he would rule on directed verdict motions submitted on their behalf at a later date. A ruling with respect to the individual defendants is expected when court convenes November 29.

Motions submitted on behalf of the 16 remaining oil companies were denied, Judge Stone declaring he was "of the opinion that there is competent and substantial evidence in the record to support a finding of guilty as far as the corporate defendants are concerned." His ruling, in effect, stated the government presented sufficient evidence to require a defense.

In granting directed verdict motions for the Gulf companies, the court made it clear that he has not released four officers of the company who are not on trial at this time. The officers, who are resisting removal to Madison, are J. F. Drake, Pittsburgh, president; William V. Hartmann, Pittsburgh, vice president; H. C. Meyer, Pittsburgh, and O. H. Carlisle, Houston, district manager.

Defense arguments on behalf of Standard Oil Company of Indiana and Pure Oil Company, and their indicted officials, were concluded last week. Attorney Weymouth Kirkland, Chicago, said there was no letter from a Standard Oil Company official introduced in evidence from which it might be inferred that the company was in a conspiracy to "rig the market." He said the company's purchases of gasoline from independent refiners during 1935 and 1936, years covered by the indictment, were under the same price arrangements as purchases in the four preceding years. Simply because E. G. Seubert, company president, and Allan Jackson, vice president, were "in a position to know" about the alleged buying program of major oil companies does not mean they did know of it, and although E. J. Bullock, vice president in charge of purchases, knew about such a program, the government has not introduced "a scintilla of evidence" that he helped in the plan, Kirkland declared.

Charging the government was attempting to build up a criminal case with "inference on inference," Charles I. Francis, attorney for Pure Oil Company, declared there was no evidence among the hundreds of letters introduced of the name of Henry M. Dawes, company president, and no evidence that Dawes or C. B. Watson, vice president, had any knowledge of the alleged price fixing program. The Pure Company attorney admitted that the case might have to go to the jury as relating to R. H. McElroy, Jr., Chicago, who was in charge of tank car purchasing, as the evidence showed he was present at meetings called to discuss purchasing of distress gasoline from independent refiners. Although telegrams introduced at the meetings showed that Watson was invited, there was no evidence that he attended any meeting, Francis declared, adding that while McElroy represented the Pure vice president at one meeting, he was not authorized to make any commitments and testimony showed that "nothing was done" at that meeting.

Similar arguments were advanced by Attorney Amos L. Beaty, Tulsa, on behalf of Frank Phillips, president of Phillips Petroleum Company; by J. C. Denton on behalf of Jacob France, president of Mid-Continent Petroleum Corporation; and by William H. Zwick on behalf of Dan Moran and Harry J. Kennedy, president and vice president respectively of Continental Oil Company.

In a brief reply to defense motions, John Henry Lewin, of government counsel, charged principal executives of the companies were "hiding behind the skirts of the little fellows" in seeking acquittal.

Ohio not to intervene in Columbia case

There will be no intervention by Ohio state officials in the Common Pleas Court action brought against Columbia Gas & Electric Corporation

[*Continued on page 63*]

Labor Situation

Shell's Houston plant still closed, another may strike . . . I.T.I.O. severs relations with union . . . Texas men to select bargaining agency.

THE labor situation in the oil industry was practically unchanged during the past week, as several refineries and oil field leases remained shut down due to strikes. However, there were no new strikes called, although there is a possibility of union workers in a large East Chicago refining plant being called out. Meanwhile, employees of a refinery at West Tulsa were preparing to vote to determine their bargaining agency, and Pennsylvania operators were seeking exemption from the state's 44-hour per week working law.

Refinery Strikes Continue

Shell Petroleum Corporation's refinery at Deer Park, near Houston, was deserted last week, except for the office force and a few men in the plant. Peaceful picketing has been in effect at the plant since November 18. Negotiations to settle the dispute at this plant was further delayed last week, when it was decided to await settlement of the situation at Shell Petroleum Corporation's East Chicago refinery. However, it appeared that there was little likelihood of an immediate agreement at East Chicago, as late reports credited the company with having refused to consider three points the union wished included in the proposed contract. It was indicated that a special meeting of the members of the union would be called to take action on a strike vote.

Considering the fact that Shell Petroleum Corporation has been taking about 70,000 barrels of crude oil daily from West Texas and New Mexico districts, in addition to about 45,000 barrels from East Texas, including Rodessa field, it can be assumed that, if the strike continues for any length of time, the company will have to greatly curtail or possibly discontinue its production and purchases, as storage facilities in those districts are very limited. If that should become the case, it no doubt would greatly affect a number of producers in these regions, who would either have to shut down their wells temporarily or seek another market, which under the present circumstances would be quite difficult.

In fact the company already has curtailed West Texas and New Mexico takings somewhat.

The Shell plant at Houston has a capacity of 78,000 barrels and the East Chicago refinery of approximately 35,000 barrels daily.

The other refinery strike, which has been in effect for two weeks, had not been settled last week, as negotiations between officials of Shoreline Oil Company and an appointed committee of the union were futile. The strike involves 150 workers of the company's refinery at Lewis, Caddo Parish, near Shreveport, Louisiana.

Pine Workers Out

Company counter proposal by W. B. Pine, independent operator of Okmulgee, Oklahoma, was rejected by a strike committee of the C.I.O. affiliated oil workers union on strike against the company, made here last week. R. D. Pine, brother of the operator, expressed some doubt another conference would ever be held.

Severs Relations With Union

Officials of Indian Territory Illuminating Oil Company revealed in Oklahoma City late last week they had severed contract relations with the Oil Worker's Union within the company, an affiliate of the C.I.O. Basis for the break was the unauthorized strike of 600 employes, operating company wells in the South Oklahoma City field, and which occurred early this month.

Hope was expressed by Harvey Fremming, president of the International Oil Well Workers Union, that a contract might be negotiated within the next six months "when the union shows it is responsible."

Employees Will Choose Agency

Employees of the West Tulsa, Okla., works of The Texas Company will hold a secret election within the next few days for the purpose of choosing representatives to bargain collectively with company officials, under orders issued November 22 by the National Labor Relations Board, directing the holding of a ballot within ten days.

The election is to determine which, if either, the Oil Workers International Union, Local No. 217, or the Employees' Federation of The Texas Company is to represent them.

Although intervening in the action brought before the board by the Oil Workers Union, which filed a petition May 27, last, on which hearings were held at Tulsa September 16, the IAM did not claim to represent or bargain for any of the employees, nor did it have any membership at the plant, it was explained by the Labor Relations Board in its call for the election.

"The IAM's contention that the appropriate unit for collective bargaining was the craft unit was based upon an agreement entered into October 26, 1935, between it and the Oil Workers, with the latter agreeing not to accept workers over whom the IAM had been granted jurisdiction by the A. F. of L.," it was said. "The board found this agreement no longer controlling.

"On the other hand, the company, the Oil Workers International Union, and the Employees' Federation were all of the opinion that collective bargaining in the West Tulsa works should be conducted on a plant-wide basis. The board pointed out that the nature of the work to be done and the practices of the company in accomplishing it, have broken down, in large measure, strict craft distinctions."

Pennsylvania Hearing

Continued operation of many of Pennsylvania's 95,000 stripper oil wells after December 1 is contingent upon a decision of the state industrial board on the industry's blanket application for exemption from the 44-hour week law which becomes effective December 1.

At a hearing conducted at Harrisburg, Pennsylvania, by Examiner William J. Shea of the state bureau of wages and hours November 19, representatives of state producers stated reasons for seeking exemption from provisions of the law. Fayette B. Dow, vice president and general counsel of the Pennsylvania Grade Crude Oil Association, explained the application was being made for operators throughout the state.

Declaring that enforcement of the law would work a great hardship on state producers, E. C. Breene, Oil City, representing the association, summarized reasons the industry should be exempt as follows: 1. The general health and welfare of the workers in oil and gas would not be advanced or protected by the hour limitations. 2. Application of the hours law would impose an unnecessary hardship on the industry. 3. The schedule of hours would enforce considerable wage reduction. 4. In comparatively few counties are operations conducted by other than small companies with about 20,000 operators and royalty holders involved. 5. Properties are isolated and it would be difficult to enforce the law. 6. The producers cannot pass the additional cost on to consumers because the prices of a barrel of oil are set. 7. About 70 percent of the state industry comes in direct competition with eastern seaboard companies drawing oil from the Mid-Continent field and South America.

"There are only a few hours of actual work each day in this industry," Breene told Examiner Shea. "We've always been fair to our men, provide them a home where the lease production permits. On my properties, I pay the worker $85 a month and provide his home. His work is light and he doesn't complain if he has to work longer hours than provided in the law during some days or weeks."

When called by Examiner Shea, James D. McCormick, a representative of the International Oil Workers Union, a C.I.O. affiliate, said that none of the employees is satisfied with present hours, that they never have been nor ever will be until the industry is placed on a seven-hour day, five-and-one-half day week, with double pay for overtime.

Organizations, besides the Pennsylvania Grade Association, represented were the Central Pennsylvania Producers Association, the Middle District Association, the Western Pennsylvania Producers Association and the Bradford District Production Association.

Oil at Conventions

Mid-Continent tax group meets this week, and Electric Club follows . . . Southwestern and Mid-Continent A.P.I. name dates and sites.

DATES for several oil industry conventions were made known last week, foremost among which was the Mid-Continent and Southwestern districts of the American Petroleum Institute'sDivision of Production. The Petroleum Electric Power Club announced the program for its Ninth Annual Conference, scheduled for December 9 and 10 in Shreveport.

Petroleum Electric Club meets December 9 and 10

The Ninth Annual Conference of the Petroleum Electric Power Club will be held December 9 and 10 at the Washington-Youree Hotel in Shreveport.

The following program has been arranged:

9:30 a.m. Thursday, December 9

Address of Welcome by M. T. Walker, vice president, Southwestern Gas and Electric Company.

Address by A. B. Morgan, Edison Electric Institute.

Purchased Electric Power for Production, by R. E. Patrick, Kansas Gas and Electric Company.

General Discussion of Electric Power for Production, led by R. E. Patrick.

1:30 p.m. Thursday, December 9

Purchased Electric Power for Pipeline Pumping, by F. A. Graham, Kansas City Power and Light Company.

General Discussion of Purchased Electric Power for Pipeline Pumping, led by Mr. F. A. Graham.

Purchased Electric Power for Refining, by K. K. Kreamer, Houston Lighting and Power Company.

General Discussion of Purchased Electric Power for Refining, led by Mr. K. K. Kreamer.

Banquet at 7:30 p.m.

9:30 a.m. Friday, December 10

Note: The day will be devoted to business of the Club and will be closed to all except the membership.

Report of the Nominating Committee.

Election of Directors for 1938-1939.

Selling Purchased Electric Service, by R. D. Hayes, Middle West Utilities Company.

Report of the Advertising Committee, by W. H. Stueve, Chairman Oklahoma Gas and Electric Company.

Discussion of the Advertising Program, led by W. H. Stueve.

Report of the Treasurer, by E. L. Robinson, Treasurer Gulf States Utilities Company.

1:30 p.m. Friday, December 10

Announcement of New Officers, by E. A. Armstrong, Public Service Company of Northern Illinois, Chicago, Illinois.

Progress Report, by F. M. Austin, Houston Lighting and Power Company.

Round Table Discussions on Production, Pipelines, Refining, Advertising, Membership.

Annual meeting of standing tax groups

General Chairman George W. Foster, The Texas Company, Houston, and F. B. Plank, Cities Service Oil Company, Bartlesville, of the Standing Committee on State and Local Taxation and Standing Committee on Federal Income and Excise Taxation respectively, have issued a call for the Joint Annual Meeting of the Standing Tax Committees to the Mid-Continent Oil & Gas Association to convene at the Baker Hotel, Dallas, Texas, on Thursday and Friday, December 2 and 3, 1937.

The Program Committee has announced that the Joint Annual Meeting will open at 10:00 a. m. on Thursday, December 2, with the first morning session to be devoted to an address by President J. D. Collett, and reports of various Steering Committees and Subcommittees.

General Baird H. Markham, director of the American Petroleum Industries Committee, New York City, will deliver the address at the annual dinner which will be held in the Crystal Ball Room, Baker Hotel, at 6:30 p. m. on Thursday, December 2. The subject of General Markham's address will be "Oil Industry Taxation."

At a general luncheon to be held in the Crystal Ball Room at 12:45 p. m. on Friday, December 3, to which the general oil public is invited, the tax representatives of the oil industry will hear Hon. Ellsworth C. Alvord, general counsel of the American Mining Congress, Washington, D. C., discuss the subject "Federal Taxation—Undistributed Profits Tax—Percentage Depletion." Alvord is one of the nation's outstanding tax consultants and has received wide acclaim for recent addresses on the subject of federal finance and taxation, delivered before the American Mining Congress at Salt Lake City, Utah, in September, and before the Investment Bankers Association of America at White Sulphur Springs in November of this year.

Announce spring meeting of Southwestern A.P.I.

A. G. Levy, chairman, announced last week the spring meeting of Division of Production of the Southwestern District of the American Petroleum Institute will be held at the Blackstone Hotel in Fort Worth March 24 and 25.

W. S. Morris of the East Texas Engineering Association, Kilgore, who will serve as chairman of the program committee, is open for suggestions on authors and topics for discussion.

Other members of the program committee are J. K. Hufendick, The Texas Company, Wink; L. A. Ogden, Pure Oil Company, Fort Worth; C. E. Reistle, Jr., Humble Oil & Refining Company, Houston; W. E. Schoeneck, Ohio Oil Company, Shreveport; H. M. Staggs, Atlantic Refining Company, Dallas, and C. G. Staley, Lea County Proration Office, Hobbs, New Mexico.

Amarillo to be host to Mid-Continent A.P.I.

The annual spring meeting of the Mid-Continent District of the American Petroleum Institute, Division of Production, is to be held at the Herring Hotel, Amarillo, Texas, on February 17 and 18, 1938.

A number of committees for arranging the program and other affairs of the meeting have been appointed.

C. E. Sturdevant is chairman of the general convention committee. Members of this group are: R .C. Kay, independent operator of Amarillo; N. D. Bartlett, News-Globe, Amarillo; Mason King, News-Globe, Amarillo; and C. A. Daniels, Phillips Petroleum Company, Amarillo.

A committee to provide facilities and arrange for finances and other items is headed by R. C. Kay, independent operator of Amarillo. Members of the committee are: E. N. Armstrong, Shamrock Oil & Gas Company, Amarillo; Walter E. Biery, Sinclair-Prairie Oil & Gas Company, Pampa; Ed Dunigan, Dunigan Tool & Supply Company, Pampa; Ed Goebel, Jake Phillips Oil Company, Amarillo; D. J. Gribbon, The Texas Company, Pampa; Fred Radcliff, Radcliff Supply Company, Pampa; Many Rieger, Rieger Oil Company, Amarillo; and G. J. Turner, Phillips Petroleum Company, Whittenburg, Texas.

An entertainment committee, which will arrange some sort of a banquet on the evening of February 18, and other features has as its chairman Mason King of the News-Globe, Amarillo. Members of his committee are: Bill Flenniken, Halliburton Oil Well Cementing Company, Amarillo; Frank Harris, Lee C. Moore & Company, Amarillo; William McSkimins, Oil Well Supply Company, Pampa; Vern Hobbs, General Supply Company, Pampa; George Berlin, Skelly Oil Company, Pampa; Polly Parrott, Trinity Portland Cement Company, Amarillo; Alex Schneider, Schneider Hotel, Pampa; W. H. McCue, Columbian Fuel Corporation, Amarillo, and C. O. Drew, Acme Lumber Company, Pampa.

A publicity committee has been appointed also. N. D. Bartlett, News-Globe, Amarillo, is chairman. The group consists of the following members; Claude V. Barrow, Daily Oklahoman, Oklahoma City; L. G. E. Bignell, Oil & Gas Journal, Tulsa; Jack Casburn, The Oil Weekly, Tulsa; Paul Hedrick, Tulsa Daily World; Harry Hoare, Pampa Daily News; K. J.

[*Continued on page 63*]

Earnings This Year Near 1929 Peak

Oil company profits for 1937 are likely to be around 30 percent larger than for 1936, despite declining prices in final quarter. Hence earnings similar to those of 1926 and 1928 are indicated.

By L. J. LOGAN, Associate Editor

ALTHOUGH oil company earnings obviously will suffer for the final three months of this year because of lower selling prices of gasoline, the results for the first nine months were exceptionally good; and the industry consequently almost certainly will show for all 1937 one of its best records of annual earnings.

It now appears certain that the industry will not this year equal the earnings of 1929, the best on record, although it seemed possible earlier in the year that such a recovery of earning power might be achieved.

But the profits for 1937 probably will not fall very far short of those for 1929; and they are likely to be comparable closely with those of 1928 and 1926, two other unusually good years for the industry.

For it now is indicated that 1937 earnings will be around 30 percent larger than those of 1936, and such an improvement over last year would push profits up around the 1928 and 1926 levels but not quite up to the 1929 peak.

Best Year Since 1929

The prospect of a better record for this year than for last year also means that 1937 promises to be the most profitable year for the past eight years, or since 1929.

After reaching the all-time peak of 1929, oil company earnings dropped sharply in 1930, to less than half the banner year peak; and further recession ensued, resulting in substantial loss for the industry as a whole in 1931.

But improvement in 1932 brought some small profit for the industry as a whole, as profits outweighed reported losses; and subsequent years have brought steady improvement, until earnings have recovered to a comparatively high level.

The estimate that profits of oil companies for 1937 will be around 30 percent higher than those for 1936 makes allowance for a substantial decline of earnings in the final quarter, while at the same time giving effect to the favorable results throughout the first nine months of the year.

Final Quarter Prospects

The expectation that earnings will prove less favorable for the final three months is based on the fact that gasoline prices at the refineries and at the service stations have declined materially since October 1, while no substantial improvement of those prices is in prospect before the end of the year.

The lower gasoline prices obviously will have an adverse effect on the earnings of the larger companies that engage in refining and marketing as well as on smaller concerns that specialize in refining or marketing.

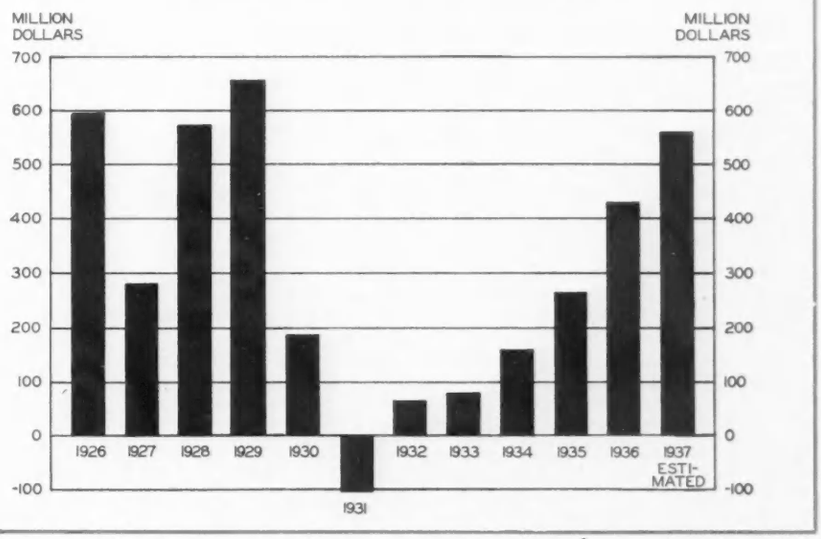
Companies that are strictly producers, however, promise to show continued good earnings for the final quarter; while larger companies that produce large proportions of their crude oil requirements also may be expected to fare comparatively well. For crude oil prices so far have held up in the face of the gasoline market weakness, and prevailing strict control of production gives promise that the established crude postings will remain safe at least until the year's end.

Outlook for 1938 Obscure

While the general uncertainties and the unsettled markets within the industry make it difficult to es-

Earning of 44 Oil Companies

Reported net profits for 1926-1936, and estimated profit for 1937



timate earnings for the final quarter of 1937, they also make it highly impractical to forecast earnings in 1938.

It appears quite likely that volumes of business of oil companies in 1938 will compare favorably with those of 1937; and in fact they probably will be greater, for only a major depression would be likely to bring about an actual decrease in petroleum consumption, which normally is still growing.

But large volumes of business have little significance unless selling prices are favorable. And the outlook for prices in 1938 is at present quite obscure. In its present weakened condition, the gasoline market offers but little promise of profit possibilities in the near future. And in view of the gasoline situation, crude prices do not appear safe for very long.

Consequently, while the oil industry probably will continue to handle large volumes of business in 1938, it may have considerable difficulty in maintaining prices and profits at the favorable levels of 1937.

Third Quarter Good

For the third quarter of this year, the earnings of oil companies continued to show nearly as much improvement over the corresponding months last year as they had done in the second quarter, although the improvement was less pronounced for both the third and second quarters than for the first three months of this year.

For the industry as a whole, the third quarter profits probably were around 30 percent better this year than last year.

Exact information on the third quarter results is not available, since some of the oil companies, particularly the larger concerns, issue financial reports only annually or at the middle and end of each year.

But sufficient quarterly reports are issued to afford good indication of the trends of earnings in the industry.

Profits Up 38 Percent

Thus for the third quarter of 1937, a group of 28 companies reported an aggregate net profit of $57,299,226, as shown in an accompanying table. That was 38 percent more than the $41,456,308 earned by the same companies in the corresponding three months last year.

This group is fairly representative of the industry as a whole, since it includes a considerable number of fully integrated companies, some strictly producing concerns, and some that buy more crude than they produce; while operations in all sections of the country are reflected.

Nevertheless, some of the largest oil companies are not among the 28 in the group, and it is possible that their improvement in earnings might have been somewhat smaller than that of the group of 28.

Upward Trend Flattening

As compared with the 38 percent improvement in third quarter earnings this year over last year, a gain of 42 percent in second quarter profits was shown by a group of 25 companies, according to a tabulation presented in these columns August 23, 1937, page 16. The 25 companies were largely the same as the 28 in the accompanying table.

It is indicated, consequently, that there occurred in the third quarter of this year some further flattening out of the upward trend of oil company earnings, just as the second quarter had brought less sharply rising profits than the first quarter.

First Nine Months

The 28 companies that are included in the accompanying table showed for the first nine months of this year net profit of $149,532,534. That was 45 percent more than the $103,264,872 they earned in the similar period last year.

While the 28 companies represent a good cross section of the industry, the group does not include some of the larger concerns; and for the industry as a whole, the profits for the first nine months probably were only between 35 and 40 percent better this year than last year.

While quite gratifying, this improvement is less pronounced than that shown by the industry in comparing the first six months of this year and last year. The table in the issue of August 23, 1937, page 16, showed that a group of 38 oil companies had 48 percent more profit in the first six months of this year than in the similar period last year.

Net Profits of 28 Oil Companies This Year, Compared with Last Year

After all deductions, including interest, depreciation, depletion, amortization, federal taxes, minority interest, etc.

COMPANY	QUARTER ENDED SEPTEMBER 30			FIRST NINE MONTHS		
	1936	1937	Percent Change	1936	1937	Percent Change
First Group—						
Amerada Corp.	*$475,336	$603,773	+ 27	$1,405,632	$1,673,880	+ 19
Atlantic Refining Co.	3,023,809	4,049,244	+ 34	6,161,200	7,486,000	+ 21
The Barber Co., Inc. (formerly General Asphalt Co.)	A147,038	A226,855	+ 54	218,605	629,649	+188
Barnsdall Oil Co.	A509,690	B976,364	+ 92	1,719,584	B2,232,694	+ 30
Cities Service Co.	*270,242	884,789	....	3,939,202	5,283,526	+ 34
Continental Oil Co. (Delaware)	3,727,357	3,730,045	+1/7	C8,083,624	D11,614,575	+ 44
Derby Oil & Refining Corp.	27,120	37,021	+ 37	232,060	435,677	+ 88
Houston Oil Co.	49,937	328,411	+558	308,731	1,253,824	+306
Louisiana Land & Exploration Co.	553,427	518,600	— 6	1,464,119	1,529,818	+ 4
Mid-Continent Petroleum Corp.	1,784,411	1,512,118	— 13	4,198,678	4,605,879	+ 10
North Central Texas Oil Co.	E21,899	E35,106	+ 60	E56,346	E92,964	+ 65
Ohio Oil Co.	1,763,417	3,592,654	+104	6,212,981	10,315,011	+ 66
Pacific Western Oil Corp.	270,158	229,951	— 15	913,279	1,232,249	+ 35
Panhandle Producing and Refining Co.	F24,351	F91,211	+274	F105,131	F227,887	+117
Phillips Petroleum Co.	5,498,603	7,134,638	+ 30	12,834,905	19,813,719	+ 54
Plymouth Oil Co.	448,144	750,974	+ 68	1,266,199	2,113,970	+ 67
Quaker State Oil Refining Corp.	305,159	172,731	— 43	857,218	1,052,291	+ 23
Seaboard Oil Co. (Delaware)	611,068	552,164	— 10	1,837,276	1,782,382	— 3
Shell Union Oil Co.	7,210,230	7,503,291	+ 4	G16,512,053	15,984,218	— 3
Skelly Oil Co.	1,307,595	1,911,022	+ 46	3,511,431	5,346,940	+ 52
Standard Oil Co. of California	7,685,528	13,355,627	+ 74	16,665,074	31,135,817	+ 87
Sunray Oil Corp.	212,842	272,430	+ 28	474,014	844,490	+ 78
Superior Oil Corp.	26,487	171,418	+547	170,011	314,197	+ 85
Texas Gulf Producing Co.	244,835	260,546	+ 6	E659,509	718,653	+ 9
Texas Pacific Coal & Oil Co.	E168,270	E260,042	+ 55	E466,553	E715,548	+ 53
Tide Water Associated Oil Co.	3,225,570	4,474,733	+ 39	8,504,934	12,171,435	+ 43
Union Oil Co. of California	H2,400,000	H3,650,000	+ 52	H4,400,000	H8,850,000	+101
H. F. Wilcox Oil & Gas Co.	4,269	13,558	+218	86,533	75,241	— 13
Total 28 Companies	41,456,308	57,299,226	+ 38	103,264,872	149,532,534	+ 45

* Loss.
A Based on a comparison of company's reports for the six and nine months periods.
B Includes non-recurring profits of $250,000 from sale of property.
C Includes profits of $1,315,260 on sale of certain properties.
D Includes non-recurring profit of $46,812 in first quarter 1937; $62,523 in second quarter 1937.
E Before Federal income taxes.
F No provision has been made for federal income, excess profits or undistributed profits taxes.
G Includes profit of $2,909,807 from sale of investment in affiliated companies.
H Estimate.

BLEED-OFF ARRANGEMENT PERMITTING SLOW RATE OF RELEASE PROVES BEST FOR

Gas Lock Conditions in Pumping Wells

By R. H. McLEMORE
Sun Oil Company

A PROBLEM that has long bothered operators in areas where the production must be obtained by pumping is the tendency of wells to gas-lock before the daily allowable has been produced. This condition is brought about by the accumulation of free gas in the casing, which lowers the fluid level below the tubing perforations and allows the gas to collect in the working barrel. The well is then in a state of equilibrium. The casing pressure plus the weight of the fluid in the casing, up to the tubing perforations, puts sufficient back pressure on the face of the sand to prevent any more oil from coming into the bore of the well, and with the tubing full of fluid, the gas cannot escape from the working barrel. The plunger, moving up and down within the barrel and compressing the gas that does not slip past the cups on each stroke, cannot lift its load of fluid on each upstroke.

Low Release Rate Helps

Usually this condition can be prevented by releasing the casing pressure and allowing the fluid to rise in the casing and submerge the perforations. A sudden release of this pressure will often pull sand into the well, and any reduction in casing pressure beyond that which is necessary will increase the water encroachment hazard and also result in an unnecessary waste of reservoir energy. The amount of gas that will have to be produced from the casing in order to obtain the production or allowable will vary according to the bottom pressure, the depth of the tubing perforations and the quantity of free gas that is being released by the oil within the hole. It is often necessary to release all of the gas that will escape from the casing head open to the atmosphere in order to keep the well from gas-locking, but it is also true, often, that only a small amount of gas, bled off into the atmosphere, or into the separator, is necessary to maintain the fluid seal. It is the purpose of this article to determine the minimum amount of gas that must be released in order to get the day's production in spite of gas-locking difficulties.

To do this the necessary quantity of gas should be released at as small a rate as possible, over as long a period of time as possible. The ideal way to accomplish this is to adjust the bleed-off arrangement so that the gas is released through a constant size opening over the 24-hour period. It is advisable that the casing head be tied into the flow line, past the flow line check valve, as this decreases the fire hazard at the well, conforms with the railroad commission regulations and permits measurements to be made of the total gas produced by the well.

This bleed-off arrangement is easily made on a well that is pumped 24 hours daily by installing a valve or pet-cock on the line going to the flow line from the casing head, and adjusting the rate of bleed-off so that a pressure a few pounds lower than that pressure at which the well will gas-lock is held on the casing.

Determining Method

The procedure of determining the correct minimum quantity to be bled off from the wells which are pumped only a few hours each day is somewhat different. First, the pressure at which the well will gas-lock must be determined, the casing bled down to some point lower than this and this pressure noted. Next the well should be started pumping and the quantity of oil produced determined, together with the time required to produce this quantity before the well gas-locks.

Let:

t = hours well produced before gas-locking.
Q = barrels of oil produced before gas-locking.
Q_s = barrels of oil produced from sand before gas-locking.
Q_c = barrels of oil pumped from annular space between tubing and casing before gas-locking.
P_1 = casing pressure at time pump was started, lbs./sq.".
P_2 = casing pressure at time well gas-locked, lbs./sq.".
h = pressure due to hydro-static head of 1 foot of fluid, lbs./sq.".
V = barrels per linear foot of annular space between tubing and casing.

Then,

$$Q_c = \frac{(P_2 - P_1)\ (V)}{h} \qquad (1)$$

$$Q_s = Q - Q_c$$

$\frac{Q_s}{t}$ = barrels fluid per hour produced from sand.

$\frac{Q_c}{t}$ = barrels fluid per hour pumped from annular space.

Given these values, and the quantity (Q') of fluid

that is to be produced per day, the time(t') required for this production can be determined:

$$t' = \frac{Q'}{\frac{Q_s}{t} + \frac{Q_c}{t}} \qquad (2)$$

$\frac{Q_s.t.}{t} = Q_s'$ = fluid to be produced from sand during producing period, barrels.

$\frac{Q_c.t'}{t} = Q_c'$ = barrels fluid to be pumped from annular space.

Substituting Q_c' for Q_c and P_3 for P_1 (where P_3= the pressure to which the casing must be lowered to maintain the fluid seal), formula (1) becomes:

$$Q_c' = \frac{(P_2 - P_3)}{h}(V) \qquad (3)$$

Solving for P_3:

$$P_3 = P_2 - \frac{hQc'}{V} \qquad (4)$$

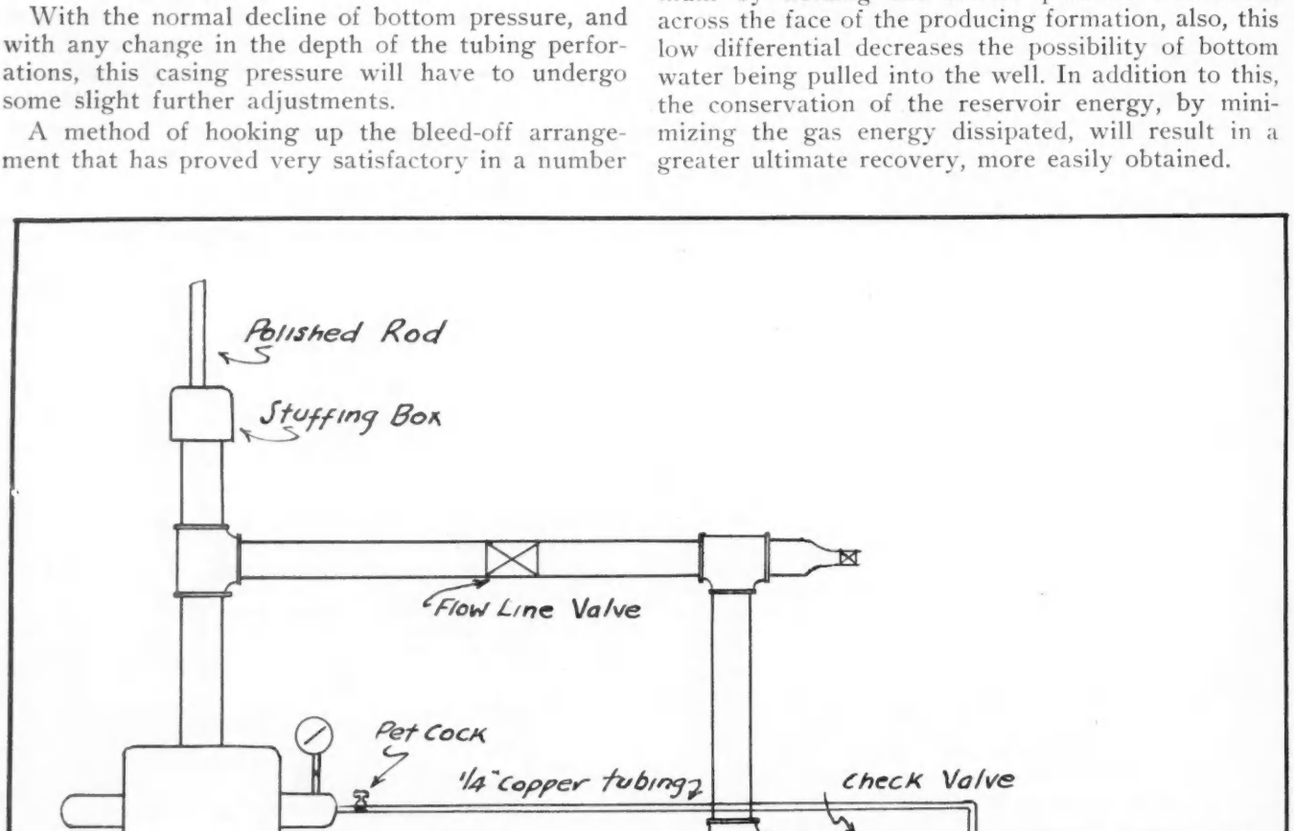
A negative value of P_3 will indicate that the pressure cannot be lowered to the point required to obtain the desired production without gas-locking during one pumping period. Usually this can be overcome by obtaining the production over two or more periods each day, or by lowering the tubing so that more fluid can be pumped from the annular space, and the fluid seal still be maintained.

With the normal decline of bottom pressure, and with any change in the depth of the tubing perforations, this casing pressure will have to undergo some slight further adjustments.

A method of hooking up the bleed-off arrangement that has proved very satisfactory in a number of places, where it is necessary to bleed only small quantities of gas, has been to connect the casing with the flow line by means of ¼-inch copper tubing, adjusting the rate of bleed-off with a small petcock. This is cheaply and easily installed and is entirely adequate in a number of fields.

If the lease pumper notes the pressure each day before the well is started pumping, which will be the minimum pressure, and again as the well is stopped pumping, which will be the maximum pressure, and if these pressures are plotted on a curve each day, it will be found of value in determining when the well is not pumping properly. The maximum pressure will drop down each day if the cups are beginning to wear, until it is identical with the minimum pressure by the time the cups are completely worn out. This curve is especially useful on leases where a large number of wells are pumping into one battery. In this way the ailments of the wells can be determined without the necessity of individual tests, which are often inconvenient to make. A well that is gas-locking will rise to its maximum pressure before the pumping period is over, indicating the necessity of further adjustment of the bleed-off arrangement.

A system based on these adjustments can prove of great value, both in time saved and in wear of equipment, as it permits the production to be obtained in the minimum of time each day. The danger of pulling sand into the well is reduced to a minimum by holding the lowest possible differential across the face of the producing formation, also, this low differential decreases the possibility of bottom water being pulled into the well. In addition to this, the conservation of the reservoir energy, by minimizing the gas energy dissipated, will result in a greater ultimate recovery, more easily obtained.



CASING BLEED-OFF ARRANGEMENT FOR PUMPING WELLS

Water-Flooding of Oil Sands

By PAUL D. TORREY, Geologist,
The Sloan & Zook Company

PART I
Introduction and History

RESULTS that can be expected from intentional flooding of partially depleted oil sands and methods that may be employed most advantageously to obtain desired results have been brought to the attention of the oil industry in Illinois for several years. In 1932 Bell and Piersol published an excellent account of the water floods that were in operation in the state at that time.[1] The information in this paper was later supplemented by Dr. Bell in 1934.[2] Much data have been published on the extensive water-flooding operations in the Bradford and Allegany fields of northwestern Pennsylvania and southwestern New York, and more recently considerable attention has been devoted to and interest shown in the application of water-flooding for the purpose of increasing oil recovery in the shallow fields of southeastern Kansas and northeastern Oklahoma.

Future Application

Notwithstanding the fact that only a very small percentage of our national oil production is derived from water-flooding operations, there is every reason for carefully considering the possibility of its more widespread application. Under certain conditions, which will hereafter be thoroughly discussed, water-flooding is unquestionably the most efficient method for increasing oil recovery that has been devised. In fact, it can be shown in quite a few instances that effective water-flooding operations will result in a larger oil production than ever has been obtained by natural methods of production. Water-flooding holds forth many advantages over natural production, owing to the methods which have been developed to control the yield of oil as it may be desired by the operator and owing to the rapidity with which increased oil production can be obtained.

PART I of Torrey's thesis, published herewith, is the first of several parts which will appear in The OIL WEEKLY. The remaining will take up such matters as geologic factors affecting the successful application of water-flooding, physical and lithologic characteristics of the oil producing formation which affect the adaptability of a field to water-flooding, theoretical considerations involved in water-flooding, development of water-flood properties, drilling practice and surface equipment, operation of water-flood properties, and the application of electrical well logging.

The paper was presented before the fifth annual meeting of the Illinois Mineral Industries Conference.

Start Early

It is therefore most appropriate to emphasize at this point that due consideration to the possibility of water-flooding should be given to every new field. Cores of the producing formation should be taken and studied to ascertain whether the pay possesses characteristics which would be adaptable to successful water-flooding operations. If it is found that favorable conditions do exist, the drilling and operation of the field should be so planned and conducted that additional recovery can be obtained with little extra expense after natural oil production has declined to an uneconomic level.

In preparing this paper, the writer has had in mind the desirability of eliminating as much as possible an involved discussion of the more technical aspects of water-flooding. It is his purpose to set forth the results that have been obtained and the reasons why they have been obtained, and to point out conditions under which water-flooding may in the future find a much wider application.

Natural Versus Artificial Floods

In the beginning a definite differentiation should be made between a natural water flood, or as it is more frequently called "water encroachment," in an oil field, and intentional water-floods where the water is introduced into the oil sands by artificial means.

Problems of controlling natural water encroachment in oil fields have confronted the industry almost from its beginning. Premature invasions of water into the producing formations, either through faulty equipment or through a wasteful dissipation of the reservoir energy, frequently have been responsible for disastrous results, the water advancing rapidly through the more permeable parts of the pay and drowning out the wells, leaving much of the original oil content of the pay unaffected and in most instances, in a condition making it very difficult to recover at a later date.

There are, however, many instances where the effects of normal water encroachment have been most beneficial to the ultimate recovery

[1] Bell, Alfred H., and Piersol, R. J., Effects of water-flooding on oil production from the McCloskey sand, Dennison Township, Lawrence County, Illinois: Illinois Geol. Survey, Press Bull. No. 22, June 18, 1937.

[2] Bell, Alfred H., Further data on natural water-flooding in Illinois oil fields: Illinois Geol. Survey, 1934.

of oil. The great East Texas oil field is an outstanding example of this fact. Rapid water encroachment has been prevented by reduced oil production allowables, and the advance of the water, being controlled in proportion to the withdrawals of the oil from the reservoir, will undoubtedly add materially to the total recovery from the field.

Penalty of Coning

The control of water encroachment in the East Texas field is relatively simple in comparison to the conditions found in many other oil fields. Where the structural relief of the field is not of sufficient magnitude to permit a complete original separation between oil-bearing and water-bearing pay along the flanks of the structure, many complications may arise in an attempt to utilize the flushing effect of the water moving through the reservoir as the oil is removed. Under such conditions, the upper part of the sand will generally be found to be oil-bearing whereas the lower part will carry water, and great care must be exercised in drilling the wells so that the lower water-bearing parts are not penetrated. Regardless of all of the precautions that may be taken, if the sand is to any extent a homogeneous body, the water will have a tendency to come upward into the well, necessitating the plugging back of the hole. This coning effect may be temporarily helpful, in that oil is floated upward into the hole, but its eventual results are generally of no permanent value; for when the water-oil ratio becomes too high to permit profitable operation, the hole must be plugged back, thereby trapping oil between well locations.

Individual Conditions Govern

The benefits that may be attributed to, or the damage that may be done by, natural water encroachment will therefore depend entirely upon individual conditions in each field. Where the effects of water encroachment can be controlled, great benefits may be expected both from the conservation of reservoir energy, thereby prolonging the flowing life of the wells, and from the flushing action of the water as it moves through the sand. Where the encroachment of water cannot be controlled, every precaution should be taken to hold the water back from the oil-producing area by the plugging back of wells, by the artificial cementation of the more permeable lenses of the pay, or by building up the bottom-hole pressure of the reservoir by the artificial introduction of gas.

Strictly speaking, fields which produce entirely under hydraulic control may not be expected to react favorably to artificial water-flooding. Fields which begin to produce under volumetric control and then change to production under hydraulic control can generally be placed in the same category. But those fields which begin to produce under volumetric control and then change, due to the exhaustion of most of the original gas content of the reservoir, to capillary control may in great part be regarded as favorable prospects for artificial water-flooding.

History of Water-Flooding

Intentional water-flooding of oil sands for increasing recovery of petroleum is believed to have been first applied in Bradford oil field, and in this field and in the nearby Allegany fields the technology of flooding largely has been developed to its present status. There is little specific information as to how intentional water-flooding originated. In fact, its early history in the Bradford field is almost legendary. It is supposed that the first floods were accidental, due to improperly abandoned holes allowing water to enter the sand. Regardless of the original means whereby flooding was started, it is known that it has been practiced for over 40 years.

For many years flooding was regarded by some of the operators as an iniquitous practice, and floods were therefore secretly developed. However, economic conditions in the fields required the adoption of some method for increasing oil production, since very few of the wells could be profitably produced under natural conditions, and water-floods were therefore openly commenced, notwithstanding legal restrictions then in effect.

Advantages of water-flooding were finally brought to the attention of the Pennsylvania legislature after floods had been in operation for quite a few years, and in 1921 a special act was passed authorizing flooding in certain of the state's fields.[3]

Early Practices

The original effects of flooding were rather haphazard. Such wells as remained in the vicinity of the input well were affected, but no serious attempt could be made to control the rate and direction of water movement, since in many cases the source of the water was unknown.

It was, however, soon discovered that in order to obtain full advantage of the initial water input well, it must be fairly well surrounded by producing wells. Old wells were utilized as far as possible, but ordinarily the original spacing used for natural production was too wide for efficient flooding operations so that it was necessary to drill at least a few new wells. The circle flood was thus developed, consisting of one water intake well surrounded by a group of producing oil wells in a more or less circular pattern. Although this method required a minimum initial capital investment, its disadvantages soon became evident. The fact that one well could not supply a volume of water adequate to deplete the surrounding area within a reasonable period of time was apparent. Furthermore, since the flood circle is expanded by each successive ring of wells, the cost of development constantly increases.

Line Flood Method

A quicker and more effective method was made necessary by the heavy investment required in drilling new circles of closely spaced wells, the high price of the land, and the necessity of protecting property lines. The line flood, consisting of producing wells staggered on both sides of an equally spaced line of water wells, met this need. This method, with various modifications, was rather generally adopted, and is still used in the Bradford field on some of the properties where development was inaugurated during the earlier periods of water-flood application.

Various methods of applying the line flood have been employed, the most general one being that of drilling a row of water intake wells across the property with a row of producing oil wells, drilled on a triangular pattern to the water intake wells, on each side. This method allows for approximately twice as many oil wells as water wells during the initial period of flood development, assuring a large oil production within a fairly short time, and a correspondingly rapid depletion. As the flood advances, additional rows of oil wells are drilled so that, in certain instances, as many as three rows of oil wells on each side of the water line are pumped at the same time.

Where cooperative agreements can

[3] An Act of the Senate and House of Representatives of the Commonwealth of Pennsylvania entitled "An Act to Regulate the Drilling, Operating and Abandoning of Oil and Gas Wells and Providing a Penalty for Violations of the Provisions of this Act," No. 322, Approved May 17, 1921.

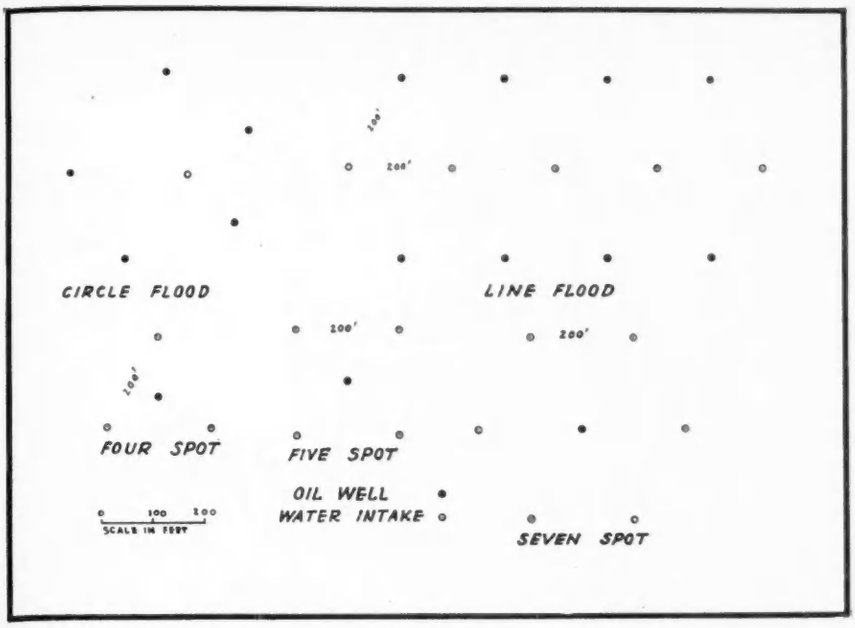


FIGURE 1

Flooding patterns commonly employed in the Bradford field.

be made between adjoining property owners, it is customary to drill the first row of water intake wells along the boundary line, and thus reduce the initial investment to each operator. Under circumstances where such agreements cannot be made, and where the owner is desirous of completely encircling his property with an advancing flood, water intake wells are alternated with oil wells along the boundary line; when the latter are depleted they are converted into water intake wells, and the development of the property then proceeds in the usual manner. The various forms of floods in common use in the Bradford field are illustrated in Figure 1.

The successful application of the line flood was soon reflected in an increase in acreage values so that the intensive development of properties, consisting of drilling up the entire area of the lease according to some fixed geometric pattern, naturally resulted.

Intensive development was first attempted in 1924, but the well spacing used was so wide that it did not give appreciable results.

Intensive Development

In 1927 an intensive flood was drilled in the northern part of the Bradford field, in which the wells were better spaced to conform to existing sand conditions. The satisfactory results obtained from this flood clearly indicated the possibilities of the method. Since then some form of intensive development has been almost universally adopted for all new operations.

Advantages of an intensive development, the most common type used being the five spot, over the line flood or other less systematic methods of flooding are: (1) concentration of development and operations in one area which results in a material reduction in operating expense; (2) rapid depletion, which further reduces operating costs and interest charges, and also provides a rapid return of invested capital; and (3) a more efficient flooding of the sand with a consequent increase in oil recovery.

Land values in the Bradford and Allegany fields naturally increased as the technology of water-flooding was improved, and this increase in valuation has led to rather extensive exploration throughout the Pennsylvania grade area for other fields which might respond to the same methods for increasing oil recovery. There are several experimental floods in operation outside of the Bradford field in western Pennsylvania. None of these floods has reached a sufficiently advanced stage to indicate how successful they will be, but it is believed that the application of water-flooding in Pennsylvania will not be limited to the Bradford area alone.

Illinois Susceptible

According to the information presented by Dr. Bell (previous citation), the floods in operation in the oil fields of Illinois have largely resulted from the utilization of natural water encroachment. These floods have yielded sufficient oil to indicate that intentional water-flooding might be satisfactorily applied in several areas of the state. Dr. Bell's contention for systematic coring of the sands to determine their lithology and oil content is very well taken, and in fact this procedure is absolutely essential to appraise fairly the flooding possibilities of any field, regardless of its location.

After the results that could be obtained from water-flooding in the Bradford field became rather generally known, sporadic efforts to flood the Bartlesville sand in northeastern Oklahoma were attempted. These earlier floods were commenced with little regard to geologic conditions, and considering the poor planning and even poorer operation, it is amazing how much oil has been recovered from them. They showed conclusively that the Bartlesville sand was floodable, and by so doing they served a useful purpose in pointing the way to more systematic development along the lines that had been established in the Bradford field. Now there are several active floods in operation in northeastern Oklahoma and southeastern Kansas, and it is very reasonable to believe that in the future the application of water-flooding in this region will be greatly expanded.

Little attention has been paid to intentional water-flooding in Texas due, of course, to the large natural production of that state. There are, however, a few fields in north-central Texas which should respond to water-flooding operations. During 1936 the Texas Railroad Commission granted a few permits for experimental floods, but insofar as the writer knows, nothing of a constructive nature has been established.

[To be continued]

East Texas Field Is Now Feeling Its Age

Recent pressure decline and water intrusion brings problems of salt water disposal, well remedial work and pumping to the foreground.

By BRAD MILLS, Associate Editor

THE East Texas field is showing unmistakable signs of middle age. It is graying around the temples, and much of the spring has gone from its step. The field simply is going the way of all oil fields, and the steady increase in the number of pumping wells, salt water encroachment, and increased production costs are natural developments for any intensely developed area.

Water encroachment, formation pressure decline, remedial well measures, salt water disposal, pumping installations, and operation of sub-marginal wells are urgent problems now confronting operators in the East Texas field. It does not follow that the field is in immediate danger of losing its dominant position because of this imposing series of unfavorable developments, but rather that adjustments are taking place to check the ease with which the area has produced so much oil during the past six years. The field is large enough and strong enough to withstand a great deal of abuse, but each month new complications will arise.

Unusual Performance Record

When the size and potentialities of the field are considered, its performance during the past six years may be better appreciated. The total productive area embraces more than 132,000 acres, and the average thickness of the producing formation is almost 40 feet. Although 23,000 wells have been completed in the field, the small individual well allowables permit the withdrawal of less fluid per acre per day than in the average field under proration. The average daily well allowable is only 21 barrels, yet the 23,000 outlets give a combined "pull" that cannot be denied.

The 475,000-barrel daily production of oil actually permits a withdrawal of only 3.6 barrels per acre per day, with water not considered. This daily withdrawal of oil is only .09 barrel per acre-foot. Since the recoverable oil has been conservatively placed at 600 barrels per acre-foot, the present rate of production would give the field a life of about 18 years. From a mature producing standpoint, the field already has had a life of about six years.

One producing well has been completed for each 5.8 acres, and drilling continues at a rapid pace. The field allowable has been gradually increased to offset the increase in the number of producing wells, but during the past two years it has been necessary to reduce the maximum allowable of the strongest flowing wells. The average density is approaching one well to five acres, and completions during the past year have compared favorably with the number added during the previous year.

The field has produced more than 1,100,000,000 barrels of oil and an indeterminable amount of salt water. Water production probably has not been more than five percent of the total fluid production, although during the past year the ratio of water to oil has increased sharply. In a water drive field, the tendency always is toward an increased percentage of water.

The production of more than a billion barrels of oil in less than seven years has left its mark on the producing formation, and operators along both sides of the field are feeling the effects of the tremendous fluid withdrawal. Water has encroached on the west side, while along the east side the drop in formation pressure and formation of a gas cap have been contributing factors to a less satisfactory condition.

Pressure Decline Accelerated

The accelerated pressure decline has been the result of natural forces that were at work during the withdrawal of more than 500,000 barrels of fluid daily over a long period. The decline should occasion no undue alarm, unless the overproduction of a group of wells and leases should be blamed for the more rapid decline of the past four months. In each of several sectors a single well has produced the allowable for itself and some of its neighbors, but the seriousness or extent of this practice has been difficult to determine by the various enforcing agencies. In any field having 23,000 wells, it would be impossible to keep an accurate daily check on the individual well status.

The pressure decline probably has been affected very little by outright overproduction in any group of wells, despite occasional abuses of well privileges. The more rapid pressure decline of the past 90 days should be more logically attributed to a daily fluid withdrawal considerably above the indicated critical level that would have given a flatter and more normal decline curve. Increased water production played a heavy role in the daily fluid withdrawal average, since displacement enters sharply into the picture.

The bottom-hole pressure decline since July has been more rapid than during the previous similar

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The recent check in the bottom-hole pressure decline has been the subject of a great deal of speculation, but no satisfactory explanation for an apparent pressure gain has been advanced. It is not logical to assume that the field is on the verge of a "self-repressuring" period, but rather that an adjustment has followed a severe 90-day decline period. The bottom-hole pressure on previous occasions has shown gains, but the general trend has been downward since the intensive development began. If the field continues to produce oil at the current rate, it is logical to assume that the bottom-hole pressure will continue downward.

The mechanical and human factors involved also might have affected the most recent bottom-hole pressure readings. Where methods and personnel are changed and adjusted, honest differences in interpretation are to be expected.

The next two monthly bottom-hole readings should do much to explain the apparent gain of the past month. A single month's data are not enough to furnish each monthly reading with its own explanation.

period. On July 12 the bottom-hole pressure was 1155.06 pounds, a decline of .585 pounds per million barrels of oil produced. On August 12 the pressure had dropped to 1141.35 pounds, a sharper drop of .939 pounds per million barrels produced. The bottom-hole pressure on September 12 was 1130.7 pounds, a moderate decline of .720 pounds per million barrels of oil produced during the previous month. On October 12 the bottom-hole pressure was 118.56 pounds, which was an .886-pound drop per million barrels of oil produced since September 12.

The recent rapid decline in bottom-hole pressure indicated that the field was producing fluid at the rate beyond its critical level. A daily oil production of 450,000 barrels apparently has been the maximum output that gave a flat and uniform pressure decline curve. Beyond a daily production of 460,000 barrels, the formation pressure drop steepened considerably.

Water Withdrawal Rate Important

The steady increase in water production has given a heavier daily fluid withdrawal per barrel of oil produced than was recorded one year or two years ago. The total daily fluid withdrawal, rather than the net oil production, has become an important consideration in all formation pressure calculations, the percentage of water having more prominently entered the picture during the past year. The exact effect of fluid withdrawals on the formation pressure still is a controversial subject, but every engineer concedes that each daily withdrawal leaves a permanent mark or scar on the producing formation. When calculated from a displacement standpoint, the steady withdrawal of fluid obviously becomes an important factor.

The decline in formation pressure along the west (water) side of the field has been gradual, but the thin producing section along the east side has been seriously affected by loss of formation pressure. The formation pressure always has been lowest along the east side, since the oil sand feathers out along this belt and no water is present. Along the west side water encroachment kills flowing wells at pressures that would easily flow clean wells in other parts of the field. Thus it is seen that water encroachment on the west side, and the serious drop in formation pressure on the east (dry) side form a slight pincer action that gradually will spread toward inside leases.

New Wells Influence Pressure

New completions have accelerated the pressure decline, each additional outlet having unfavorably affected the decline curve for the field. The gradual increase in field allowable during the past year also has been a contributing factor.

Of the 23,000 wells in the field, about 5000 are on the pump. The number of wells actually on the pump January 1, 1937, was about 3000. Pumping wells showed a gain of about eight per day during the first part of the year, and it is believed that the increase will continue at about the same rate. Continuation of the more rapid bottom-hole pressure decline will force a much larger number of wells into the pumping classification, and an increase of 300 pumping wells per month is a possibility.

It is indicated that the average East Texas well will not flow satisfactorily with a bottom-hole pressure less than 900 pounds, and 950 pounds is a safer minimum. Even at 1000 pounds, many wells need help to flow after an inactive period.

The increase in the number of air and gas lift wells has not been rapid. On January 1, 1937, there were 314 air and gas lift wells. By April 1 the number had increased to 358 wells. The total on October 1 did not exceed 500 wells.

The Texas Railroad Commission recently placed two large crews at work in the field in an effort to determine the true status of all producing wells. Pumping potentials were taken and a search conducted for dead wells. During the first few days 16 dead wells were found, and at the end of three weeks 84 dead wells had been found. The survey is being conducted with 18 engineers constantly on the job, and will continue until the work is completed. Many of these wells had been reported active, and probably were getting their allowables from other wells. The railroad commission started the survey because of the desire to check into all details of the sharper bottom-hole pressure decline.

The well potential in the East Texas field is 2.32 percent of the hourly potential, with a minimum of 20 barrels daily. Wells that can not produce 20 barrels daily are called sub-marginal producers, and are allowed whatever they can produce. Few wells fall in the sub-marginal class.

A reduction in the field allowable is needed to flatten the pressure decline. The economic minimum allowable is much less than 20 barrels daily for most of the producing wells, and many wells pumping only 10 barrels per day could be operated at a profit. The daily cost of producing the strong flowing wells is very low. It is unfortunate that a need exists for a smaller daily production from the field, since control of output has been remarkable and operators have largely cooperated with state authorities in efforts to keep the total within the allowable. The need for a smaller daily output per well has arisen because of the steady increase in the number of wells in the field, and the absence of a corresponding decrease in average production per well. The heavier water production also has given a greater fluid withdrawal, total displacement having more prominently entered the picture.

The intense development on small leases, particularly in the townlot sections, certainly will contribute to a more rapid decline in bottom-hole pressure in the affected areas. In the City of Kilgore, as many

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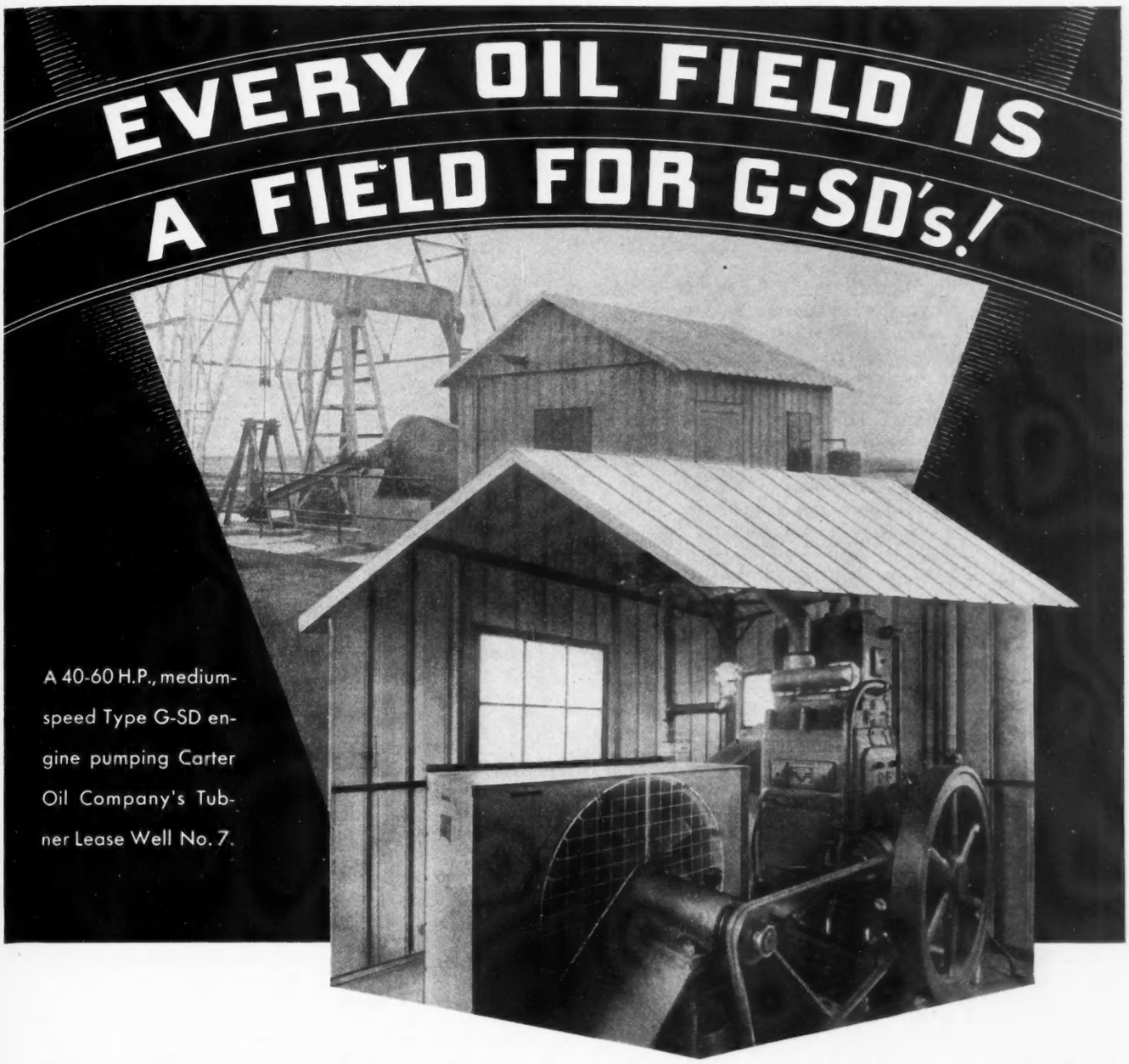

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as three wells are being drilled on single lots that are not large enough to support one well. Individual well allowables of 20 barrels will place these small leases at a distinct advantage over larger leases having only one well. It is believed in many quarters that permits to drill have been too freely given in all parts of the field.

Salt Water Increases

Salt water encroachment was not rapid during the early life of the field, but the fingering in movement of water along the west side has been pronounced during the past year. Of the 3700 wells making salt water, 1065 are flowing wells and 1635 are pumping wells. Daily salt water production October 1 was about 75,000 barrels, and of this total more than half was produced by a small group of wells. Fully 75 percent of the "water" wells make only a small amount of water daily. The most serious situation exists among the few hundred wells that produce a large quantity of water along with 20 barrels or less of oil per day per well. The heavy fluid withdrawal not only tends to reduce the reservoir pressure, but attracts increased water to sectors not yet seriously affected.

Such remedial measures as plugging back or squeezing cement into the offending strata offer opportunities to reduce water production in a large group of wells originally completed as clean producers. The recent encroachment of Woodbine water along the west side of the field has alarmed operators who were vulnerable but who simply awaited actual encroachment from the extreme edge of the field.

Well Remedial Work

The recent success in shutting off bottom-hole water by plug-back work and by squeeze cementing into water strata should lend encouragement to operators who are beginning to experience serious trouble from water encroachment. By shutting off water during the early stages of encroachment, the operator paves the way for reduced well and lease operating expense. The reduction in lifting cost and elimination of the water disposal problem are direct benefits derived from shutting off formation water. Maintenance of reservoir pressure and a longer flowing life for vulnerable wells also are important considerations.

The Woodbine sand has a high permeability. Water is acting on the producing formation from the west side, and water underlies a large part of the producing zone. Both the spread and rise of water into the formation has been noted along the west side. It has been possible to shut off or sharply reduce water production in many wells that originally produced clean oil. Many operators have been inclined to "worry along" with wells that produced only a small percentage of water. In most wells of this type, water production has increased steadily to a point that gave serious complications. Wells flowing with a small reserve energy were especially vulnerable to attack from salt water encroachment.

The East Texas field offers unusual opportunities for shutting off salt water. All the producing formation originally opened in a well should be carefully examined and the status determined before remedial work is undertaken. The origin of the water should be known before definite measures for elimination of the trouble are agreed upon, since plug-backs and squeeze jobs offer different problems.

Water disposal has become a more serious problem in the East Texas field. When the field produced only 15,000 to 25,000 barrels of water daily, disposal was largely a simple matter. Even "accidental" dumping of water did not give serious trouble during the rain storms that were used for that purpose. With a daily salt water production of 75,000 barrels, disposal during dry periods is adding to production costs on a large number of leases.

The state law permits a maximum of 2000 parts of salt to one million parts in streams of any size. This maximum would permit the release of one barrel of salt water for every 32 barrels of fresh water carried by the stream, since salt water from the Woodbine sand contains about 63,000 parts of ordinary salt per million parts. Sea water contains about 27,000 parts of ordinary salt per million parts.

The Sabine River, principal stream near the East Texas field, is capable of handling 500,000 barrels of Woodbine sand water daily, if it were possible to release it evenly and properly. Due to the dry season and uneven flow during other parts of the year, disposal by this method does not hold much promise.

Evaporation pits hold considerable promise. The rainfall in this area is about 42 inches annually, while the evaporation is above 52 inches. Evaporation is heaviest during the season of small stream volume—a favorable condition. Pits with a large exposed surface will play an important part in salt water disposal.

Several plans for construction of large disposal plants are now being considered, but engineers do not agree on the best method of attack. Central treating plants have been used to advantage in California, where townlot activity has forced careful disposal of salty and oily water. One plan now under consideration in the East Texas field calls for construction of one or more large disposal plants, with each operator to make provisions for getting his salt water into a field line.

The return of the salt water to the formation offers possibilities, but it also offers various complications, unless injected at a considerable distance from the field.

When the total recoverable oil in the East Texas field is divided among the 23,000 wells now on production, it does not seem out of line to predict a profitable outcome for most of the operators. The ultimate oil recovery probably will be around 3,500,000,000 barrels, or about 152,000 barrels per well, but a large number of the 23,000 wells did not participate in the production of the first billion barrels of oil. The indicated ultimate recovery per acre is about 26,000 barrels, but the per-acre recovery along either side of the field will be only a fraction of the average for the entire area. The recovery per acre from inside leases may reach 48,000 barrels, this total being indicated by using a sand thickness of 80 feet and a recovery of 600 barrels per acre-foot. The time factor is important in recovery, however, and the rate at which the last billion barrels are produced will go a long way toward determining the profit or loss for each well.

The average field flows from 30 to 50 percent of its recoverable oil. The East Texas field already has produced about 30 percent of its indicated recoverable oil, most of which has come to the surface under natural flow. Careful preservation of reservoir energy will be required to give the field the extended flowing life it possesses in a potential form.

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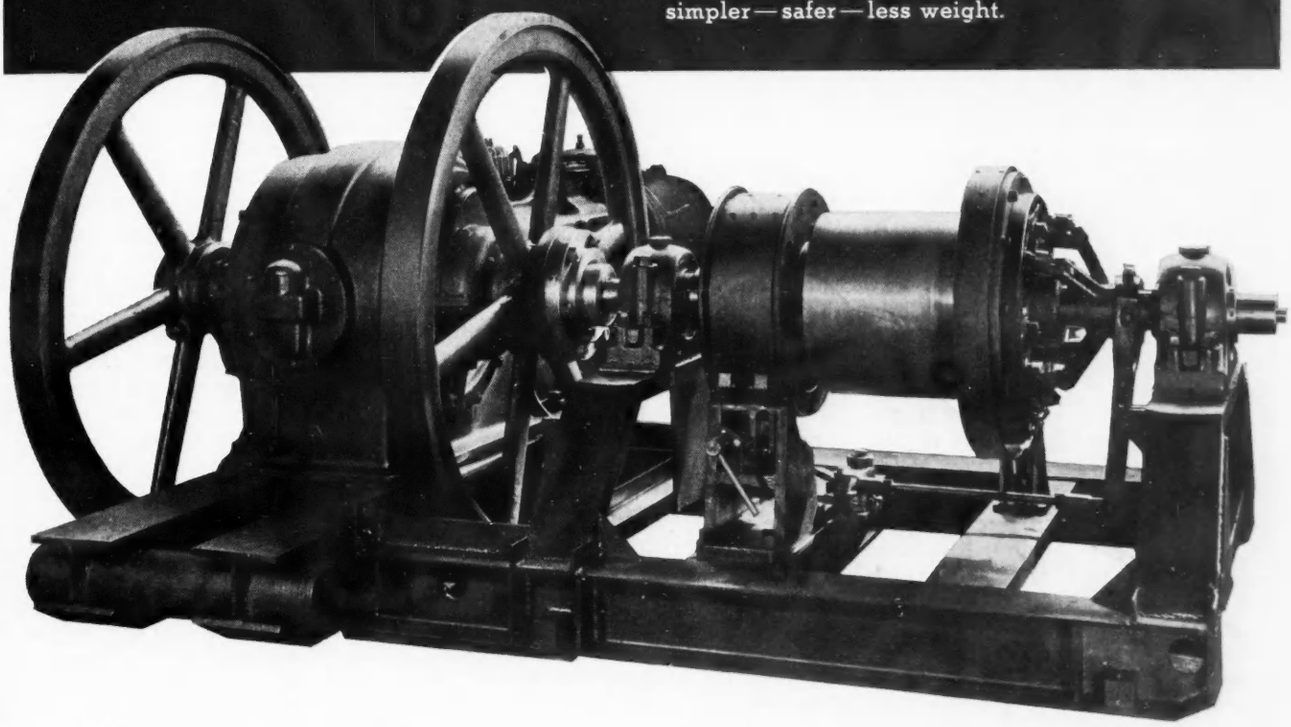

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Legal Restraints

ON

Drilling and Production[1]

By NORTHCUTT ELY[2]

PART I

DURING the past decade the petroleum industry has increasingly sought legislative assistance in meeting two problems: How to control the drilling of unnecessary wells, and how to restrain the excessive potential production resulting from inadequately controlled drilling.

Although legislative restrictions on drilling were developed in some states before proration statutes were passed, generally the emphasis has been upon production control, rather than drilling control. That emphasis now seems to be shifting. The American Petroleum Institute, the Independent Petroleum Association, the American Bar Association and the American Institute of Mining Engineers have been developing informed opinion on the relation of these two problems in much the same way that attention was focussed a decade ago on the function of natural gas in the production of oil.

Unnecessary Wells

Any well which will fail to increase ultimate recovery by an amount sufficient to return the cost of investment, plus the cost of operation and royalties, and a reasonable profit, is an unnecessary well. From this classification the "wildcat" or exploratory well is excluded. Exploration is essential whether it is productive or not.

Probably between four and five thousand unnecessary wells are drilled each year in the United States, at a drilling cost between $80,000,000 and $100,000,000 annually. This is a self-imposed gross production tax, equivalent to about 10 cents per barrel on a billion-barrel production year. It is a tax paid for the privilege of operating under the "rule of capture." In addition to the cash outlay, these unnecessary wells waste reservoir energy. Even under modern operating methods from 50 to 60 percent of the oil is left underground.

The industry is becoming weary of drilling 20,000 wells to share the same allowable production that was enjoyed when only half that number of wells had been drilled in the same area. If the industry must pro-rate what it takes out of the ground, it ought to be allowed to pro-rate what it must put into the ground.

FACTUAL RELATIONSHIP BETWEEN DRILLING AND PRODUCTION CONTROLS

The engineers seem to agree that control of production cannot be equitably enforced without concurrent control over the drilling and spacing of wells.

As Chairman E. O. Thompson of the Texas Railroad Commission has pointed out:

". . . I can see facing us most insistently the question of having some formula which will stand the test—because in Texas we are fast approaching the day when we shall have so many wells multiplied by the marginal irreducible amount as set by our law, that when you multiply the number of wells by the marginal allowance you will reach your share of the market demand. When you get beyond that point, what are you going to do?"

Figures recently released by the railroad commission confirm what Chairman Thompson was thus predicting three years ago. As of June 1, 1937, Texas had 72,150 producing wells, of which 30,357, or 42 percent, were marginal and 41,793 or 58 percent, were "proratable." The total allowable was 1,394,470 barrels, of which 846,310 were required to be allotted to the marginal wells by the marginal well act, leaving only 425,523 barrels to be prorated, or an average of only 10.2 barrels per non-marginal well.

The three-judge federal courts in Texas have insisted that the allowable for a good well must be higher than that for a poor one. The commission faces a conflict either with the marginal well statute or with the refusal of the federal courts to sanction a proration schedule based on a uniform flat allowable for every well in a field.

Six Proration Plans

One engineer, Lyndon L. Foley, has classified the various proration plans into six groups, according to their recognition of the relation between spacing and production of wells:

First, at the foot of the class he places "per-well allowances." These are equitable only if well spacing and reservoir conditions are uniform. The Texas federal courts seem to have come to the same conclusion.

Second, "straight potential." This method is equitable only if well spacing is uniform, and if well potentials are proportional to the recoverable oil in place in the drainage area of each well. There seems to be general agreement that the quantity of recoverable oil is not directly proportional to the well potential, but there is considerable uncertainty as to what the ratio between the two should be. The

[1] Before the Mineral Section, American Bar Association, Kansas City, September 29, 1937.
[2] Of the District of Columbia Bar.

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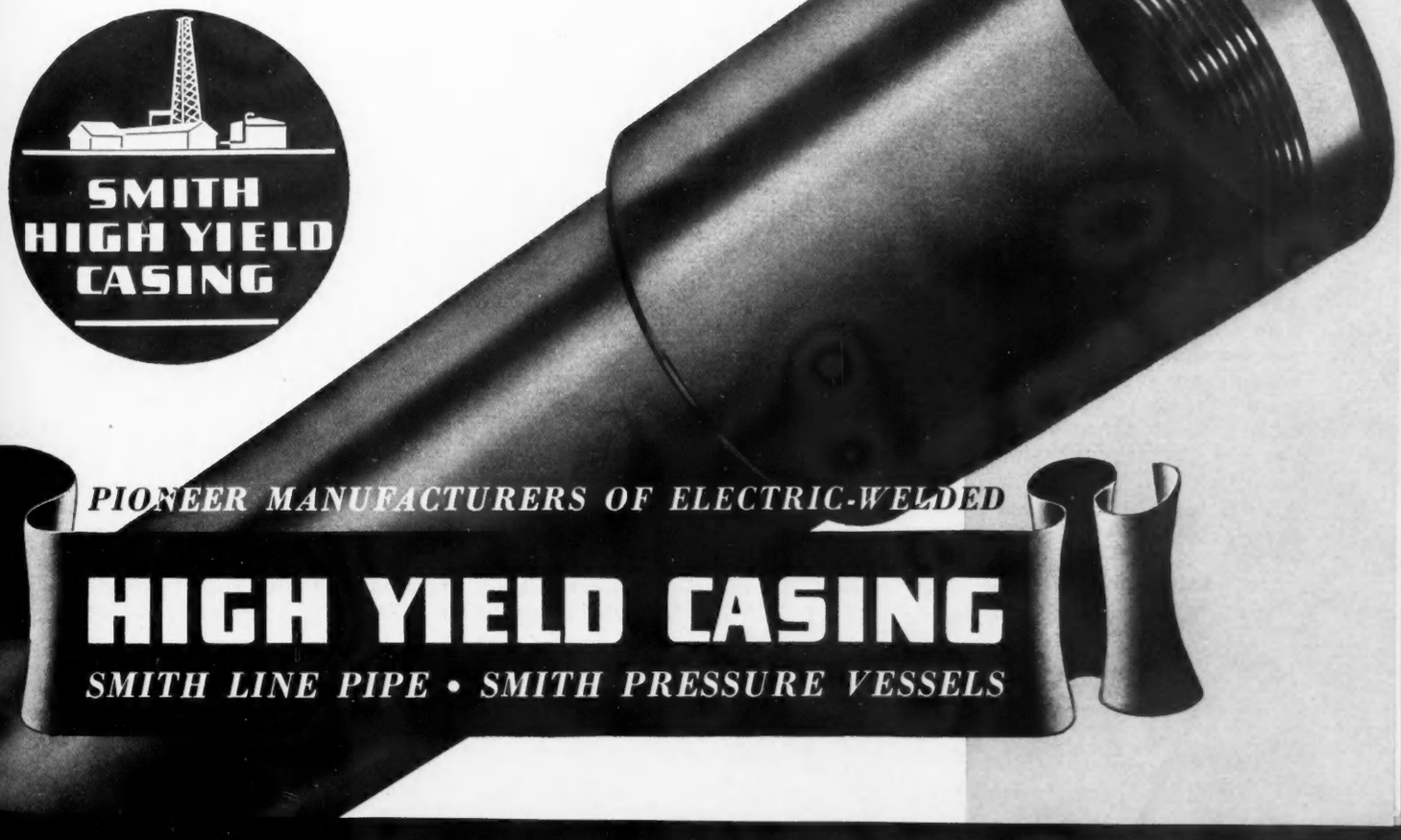

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courts have sustained straight potential allocations.

Third, "per acre allowances." This method is equitable only if reservoir conditions are uniform. The Texas cases apparently have frowned on a straight acreage basis.

Fourth, "acreage allowance plus any other allowance." In some plans the allowable has been based on the sum of two factors, one based on acreage and the other on potential. Such a program has been sustained in at least one federal case.

Fifth, "acreage multiplied by potential." This method, superior to "acreage plus potential," gives each lease a per acre recovery proportional to the well potentials. It is equitable only if the potential used is the average of all the wells on the lease, and only if potentials happen to be proportional to the recoverable oil under the lease.

Sixth, and at the head of the class, appears to be the method of "acreage multiplied by the index of recoverable oil." The index of recoverable oil is a factor taking into account the difference between static and flowing bottom-hole pressures, permeability, and thickness, fluidity, and a number of other factors.

The reluctance of the regulatory commissions to attempt complicated allocation formulas is readily understood. As Chairman Thompson said at a hearing on May 17, 1937:

"You think we can take these eleven variables and tell how much oil is under each acre? They gave Einstein a Nobel Prize for using three variables, and you are expecting us to use eleven."

Nevertheless, the wise use of reservoir energy is in effect a substitute for the drilling of unnecessary wells. It has been said that enough oil to meet the current demand could be produced at a marginal net cost of approximately fifty cents per barrel. So long as drilling is not restricted the investment per recoverable barrel increases. The attempt to maintain a price that will reward this over-investment requires stabilization at an artificial price level, in other words, price fixing. The conservation movement has enough troubles without carrying price-fixing as a hitch-hiker.

To date the law has not applied these principles very effectively.

$31,000,000 Wasted

It has been estimated that in the Oklahoma City pool, where 360 wells would have been adequate, but where nearly 700 were in fact drilled, the wasted investment exceeded $31,000,000. Another report on the Oklahoma City pool shows that one area of 160 acres, although it had produced to January 1, 1937, nearly 70 percent of its recoverable oil, would probably not repay the cost of exploitation because of the excessively close spacing.

Oklahoma's share of unnecessary drilling probably costs from $15,000,000 to $20,000,000 annually. One estimate puts the number of unnecessary wells, prior to 1937, at nearly 1400, with a total cost in excess of $85,000,000.

Kettleman Hills Example

In California, statistics are not readily available, but in the Kettleman Hills field, up to April 1, 1936, (according to Collom and Watson) over 86 percent of the volumetric withdrawals had been in the form of gas and less than 14 percent produced as oil, with a gas-oil ratio higher than six to one. Reservoir pressure had declined as much as 1½ pounds a day. There had been a decline of one pound for each 23,500 barrels produced in one part of the field. Withdrawals had apparently been in the manner best suited to maintain a full supply for the gas utilities, rather than to promote maximum ultimate oil recovery. The average bottom-hole pressure for the entire field had dropped 33.4 percent. Fifty-five percent of the field had suffered a pressure loss of approximately one-half with oil recovery of only 122 million barrels. Some 20 high-ratio wells had contributed more to the depletion of reservoir energy than all the other wells in the field. Some 2500 acres at the north end of the field will reach the critical point at which pressures will be insufficient to flow in the very near future.

It has been informally estimated that the cost of unnecessary drilling in Texas exceeds fifty millions a year, due in part to failure of Rule 37, (the spacing rule), and in part due to other causes. About 12,500 East Texas wells are claimed to be unnecessary wells, costing over $160,000,000, and unnecessary drilling is said to be continuing at the rate of over 1300 a year, at an annual cost in excess of $13,000,000, in that field alone.

Figures released by the Texas Railroad Commission in 1936 indicated that of approximately 22,000 wells which had been drilled up to that time in East Texas, over 17,000 had been drilled under exceptions granted to the spacing rule.

The relation between restraints on drilling and restraints on production, from an engineering standpoint, needs to be more clearly understood by the courts.

Proration, by definition, is a proportional division or assessment. As applied to oil production, it has a peculiar relation to the law of capture, which makes it impossible to effect a proportional recovery of oil unless there is a proportional restriction on the right of access to common reservoir.

As long as production was unrestricted, an operator was free to secure a proportional division of the oil in the pool in direct proportion to acreage, by drilling to an equal density with his neighbors, and producing at capacity. The result might be destructive of the reservoir energy and of the value of the over-produced oil. But, insofar as relative recovery was concerned, all owners started from scratch in the "run on the bank," as Henry L. Doherty called it. But proration restricted production, and hence restricted the right of self-protection.

Ideal Arrangement

Proration ought to be a bargain between the state and the operator, whereby in consideration of the curtailment which the state imposes in the interest of conservation and stabilization, the state will afford him that protection against drainage which formerly he was free to provide for himself. A statute which imposes curtailment without affording a correlative amount of protection is a statute which takes property without compensation. The protection owed has seldom been given. It is not enough that the rate of withdrawal is equalized by law if the right of access to the reservoir is not.

Proration in the absence of uniform spacing or without recognition of the acreage factor automatically results in undue drainage. It perpetuates the inequity of the rule of capture while withholding the right of self-help. It may result in greater ultimate recovery from the reservoir as a whole, in certain given cases, and it may promote stabilization by limiting production to market demand; but it does so by denying, rather than protecting, the correlative rights of the owners of a common pool which

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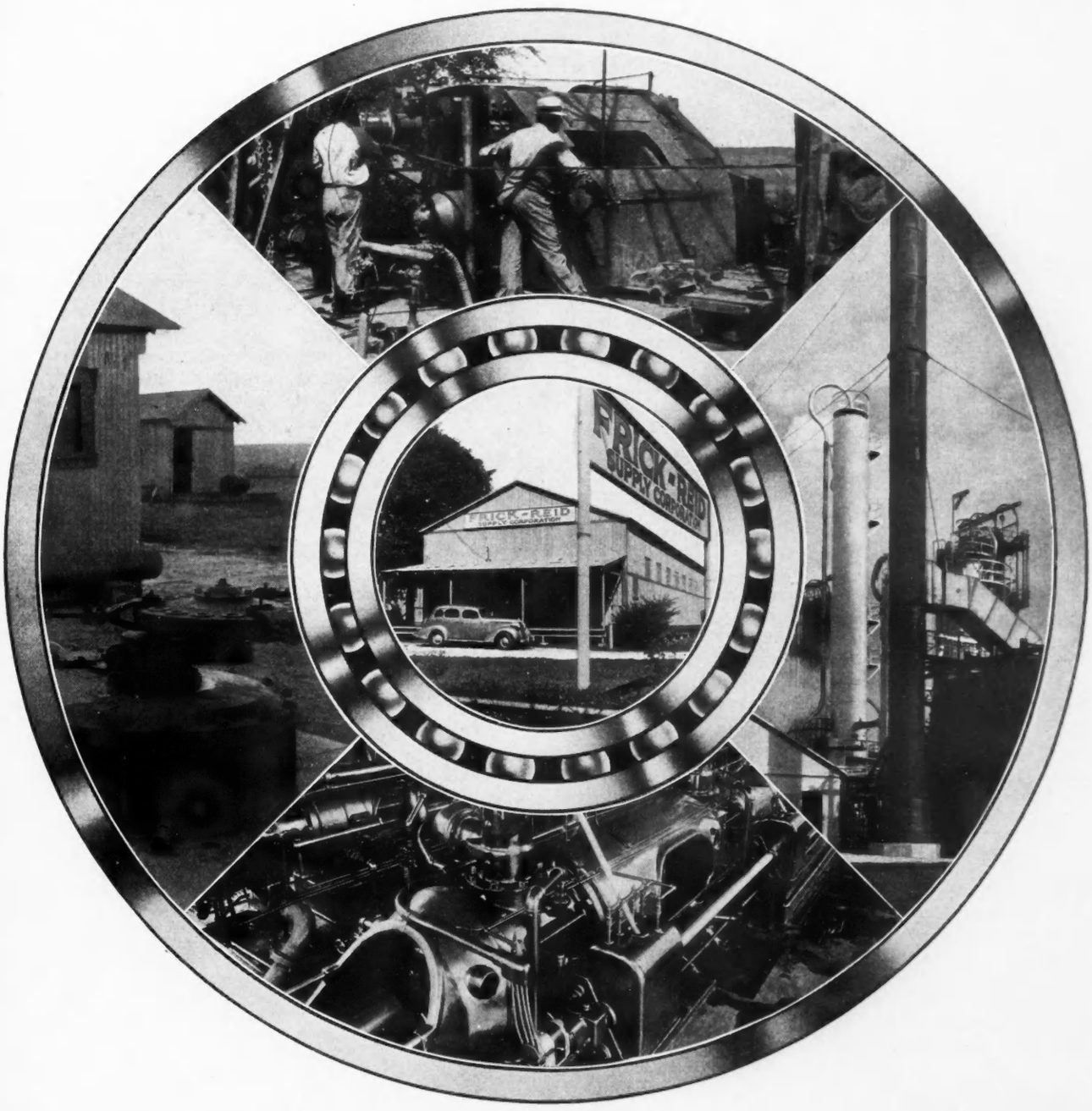

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The essential question is whether we are to continue under a system that treats oil like wild game, and treats the oil well like a shotgun, free to bag the allowable limit as many times as there are guns in the family, or whether oil is to be regarded as appurtenant to the land which contains it and subject to protection as other property is protected.

One engineer has put it this way:

"Furthermore, oil wells do not produce oil. Oil is produced by oil reservoirs, and a pipe in a well transports the oil from the reservoir to the surface of the earth in the same manner that a pipe in a trench transports the oil from the lease to the refinery. The so-called well potential is the rate at which the reservoir can deliver oil to the surface of the earth through a given well. Proration of allowable oil production should be based on reservoir conditions."

Neither the legislatures nor the courts have caught up with the engineers in their treatment of the relation between controls on drilling and controls on production.

Results of Rule 37

Texas has been the pioneer in spacing controls. Yet a spacing rule honored by twice as many exceptions as observances in a single field, and which produces more litigation in three years than the conservation laws of all the states combined in the same period, seems to lack some of the elements of perfection. Such is the status of Rule 37 in Texas.

Most of the prolific litigation over the Texas spacing rule has been initiated, not by operators who objected to the harshness of the rule, but by operators who objected to the leniency of the commission in granting exceptions to it. There are comparatively few cases in which an operator is suing to compel the issuance of an exception (and these have generally been decided in the commission's favor), but there are many cases in which an adjoining operator is suing to prevent issuance of an exception which would permit the drilling of a well closer to the line, or on a smaller tract, than the rule permits. And these, in large majority, have been decided in favor of strict application of the rule and against the proposed exception.

The conclusion seems to be that a flat spacing requirement is not equitable, nor capable of uniform enforcement, and that spacing, like production control, is only one element in a balanced equation.

Spacing Outside of Texas

But until recently other states have been far behind Texas in compulsory spacing. California has only a spacing law applying to town-lot drilling. Most of the other states have some sort of spacing requirements, but they are not intended to have any relation to proration, and have been given none. Oklahoma now has a statute which authorizes spacing units, and the allocation of production in proportion to the ratio between the well's acreage and the standard unit. New Mexico has a somewhat similar statute. To date, a high-water mark is represented by the New Mexico and Oklahoma statutes and in the valiant efforts of the Texas Railroad Commission to make a workable implement out of a flat spacing rule whose relation to control the courts have been slow to concede.

The law, in adjusting the relationship between drilling and production controls, is just beginning to develop.

REMEDIES AVAILABLE UNDER STATE LAWS

Before speculating on the kind of regulation that might bring drilling and production into proper relationship, it may be well to review very briefly the underlying basis upon which the state's power of regulation is supposed to rest.

1. The Power to Regulate Production

It is settled that the state may restrict the quantity of oil or gas produced where that is necessary to prevent waste. That ground is recognized in nearly all jurisdictions. In addition, the United States Supreme Court and most of the state courts where the questions have been litigated, have recognized the power to protect correlative rights: in other words, to prevent undue drainage. The Texas courts have been cautious in accepting that ground. However, the United States Supreme Court in the Texas case of Consolidated Gas Utilities Corporation vs. Thompson, did recognize the existence of that power and some of the recent spacing cases following the decision in Brown vs. Humble Oil Co. (83 S. W. (2d) seem to do likewise. There is, in addition, the general power to abate nuisances, which may or may not be useful in specific oil cases. Finally, it probably can be asserted now, as it could not have been a few years ago, that there is inherent power in the state legislature to control production for the purpose of stabilization, pure and simple, without regard to conservation or drainage. California now has an "Agricultural Prorate Act" under which the right to harvest crops is regulated. That statute has been sustained by the state supreme court. The statute defines wastes, saying that they "in addition to their ordinary meaning shall include agricultural waste, and waste incident to the harvesting and/or preparation and the delivery to market of agricultural commodities in excess of reasonable market demands."

2. The Power to Control Drilling

The power to restrict drilling is now demonstrated by a group of cases far outnumbering the proration cases. Because nearly all of these are Texas decisions, and the courts of that state have been chary about an outright recognition of correlative rights, most of these cases proceed on the ground of protection against waste.

But the leading case of Brown vs. Humble Oil Co. indicated that the rate of flow might be adjusted to compensate for exceptions granted under the spacing rule, to prevent undue drainage. Although the opinion on rehearing was not very satisfactory, later cases have contained such expressions as the following:

"Appellee is entitled and entitled only, to be accorded an equal opportunity with surrounding lessees to recover his fair share of the recoverable oil; or, stated differently, to recover the approximate amount of oil lying in place under his lease."

Another quoted Brown vs. Humble Oil Co. and said:

"We believe this quotation points the way to relief for any injustice or inequality, which may exist by reason of the situation presented by the record. As there pointed out, the commission has power to regulate the flow of wells, and thereby to correct any inequality or injustice; whereas, to attempt such correction by allowing additional wells as exceptions to the spacing rule would lead to interminable confusion."

In another the court said:

"We also sustain appellant's contention that the calculations, well density, and production per acre taken from larger leases in the vicinity of this tract offered in evidence by appellant, most of which were excluded by the trial court, were admissible. These were admissible in view of the facts shown as to porosity of sands underlying same, the existing common

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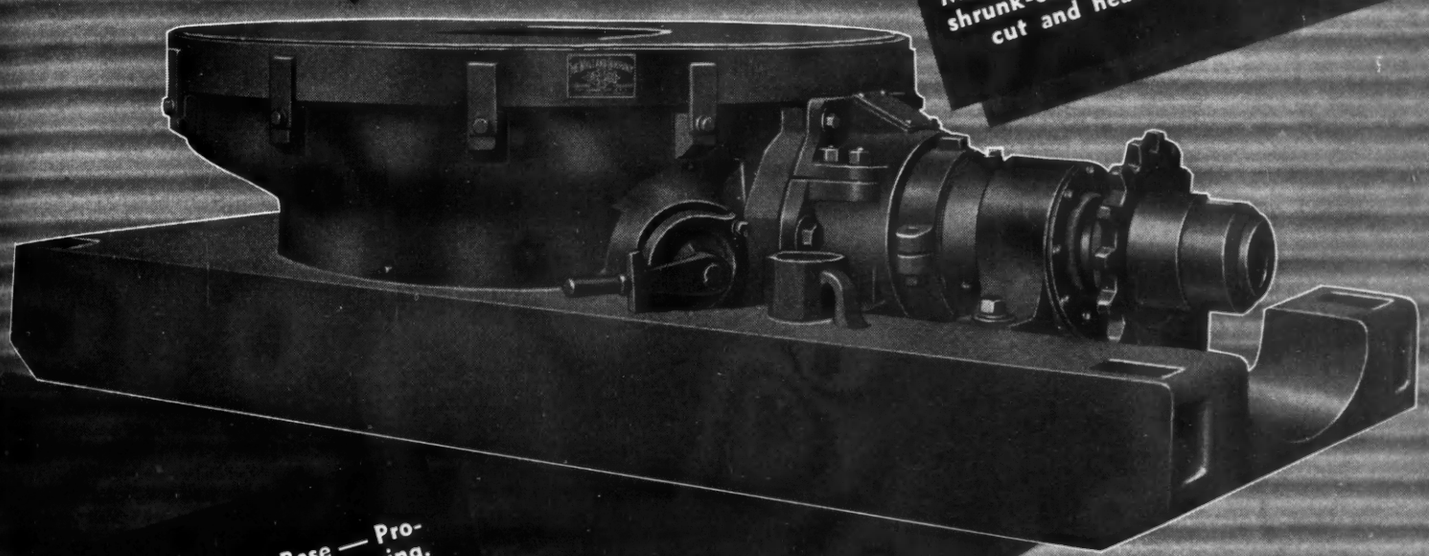

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pool in the entire area, and the tendency to equalize pressure over large areas, both on the question of increasing waste by such additional well, and particularly on the issue as to whether the one well on said tract, in its relation to the surrounding area generally, was affording the Shilo a fair opportunity to recover its fair share of the oil in place beneath its tract."

And in Boxrollium Oil Co. vs. Smith a three-judge federal court sustained a Texas proration formula which was based about one-half on acreage. In rejecting a formula offered by the plaintiff, the court said that the objection to the plaintiff's plan was that "its allowable production is larger per acre than the allowable production of the wells of others on larger tracts in such fields."

3. The Correlation of Drilling and Production Controls

Keeping in mind the rather encouraging background of decisions from the state which has adhered most strictly to the "waste" theory, it may be useful to turn to the schemes proposed for compulsory cooperative development. There are three general types of such proposals.

The first is field-wide compulsory unitization. The possibilities in that program have been fully developed before the Mineral Section of the American Bar Association by Judge W. P. Z. German, and will not be repeated here.

The second is the plan contained in the Oklahoma and New Mexico statutes. These authorize proration units in each pool, fixed at the size which one well will efficiently and economically drain and develop. Where the size or shape of an individual tract does not conform to that of the proration unit, compulsory pooling of properties may be required. However, the owner of a small tract may nevertheless drill his well, and receive an allowable proportional to the ratio between his area and the area of the standard unit. The standard fixed in any event is that the regulatory order shall "afford to the owner of each tract in the pool the opportunity to recover his just and equitable share of the oil and gas in the pool as above provided, so far as may be practicably recovered without waste."

Endorsed by I.P.A.

This method is the device endorsed by the report of the Subcommittee of the Independent Petroleum Association on the drilling of unnecessary wells, filed in December, 1936, by Robert E. Hardwicke of this section, and his associates. The legal premise upon which the I.P.A. committee proceeds in justifying that remedy is that if one well will economically and efficiently drain a given number of acres in the field, the administrative body cannot legally enforce an order which requires the operator to drill more wells in order to obtain an allowable which is adequate to give the operator his proportionate share of the recoverable oil in the field. Putting it another way, the committee says that an order is invalid which requires the drilling of a well where the income from the well will not pay for the expense of drilling and operation, and where such drilling is not necessary to recover the oil under the tract.

That report is perhaps the most practical exposition of the problem that has appeared. It is clear, however, that the states have not exhausted the possibilities in the drainage district or drilling district plan. Statutes such as the New Mexico law deter, but do not eliminate, the inter-lease competition which Dr. Joseph E. Pogue calls the root of the capture system. There are decisions which stand at the threshold of a much broader field.

The Tysco Case

The plan for compulsory pooling and limited drilling, by means of districts, was first litigated in the familiar cases of Ramsey vs. City of Oxford, and Marrs vs. City of Oxford. These cases turned on the validity of a city ordinance. But the City of Oxford case has been followed by a Texas federal court decision, Tysco Oil Co. vs. Railroad Commission, in which, although an ordinance was involved, the case was made to turn on an order of the railroad commission creating drilling districts.

In the Tysco case, the power to restrict drilling to one well to 16 acres was sustained as a conservation measure. The districts, of course, were consequently much larger than the city block units sustained in the City of Oxford case. In the Tysco case the court sustained "the power of the railroad commission to, as a conservation measure, establish reasonable drilling districts in oil and gas fields, prescribe the size thereof, space the wells therein, etc."

These drilling district cases are part of a field of law larger than our problem, a field which includes other types of property in which several people have an interest, and which can only be fully utilized by cooperative action between them.

Part II of this article will appear in an early issue of The OIL WEEKLY

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SEISMIC-ELECTRIC EFFECTS OF THE SOIL

— AND —

Seismic-Electric Prospecting

By A. BELLUIGI, Geophysicist, Addis Ababa, Ethiopia

IN 1936 Ludwig W. Blau and Louis Statham patented "Method and Apparatus for Seismic-Electric Prospecting" (U.S.A. Patent No. 2054061). R. R. Thompson and M. M. Slotnick, contributed further along these lines in "Geophysics" (3-1936) with two papers, "The Seismic-Electric Effect," and "A Simplified Circuit of the Seismic Electric Method and Its Steady-State Solution."

The geodynamic effect, about which the American authors occupy themselves, should consist of a temporary variation of the specific electrical conductivity of rocks, under the influence of elastic, artificially produced deformations of the ground.

The ohmic conductivity of rocks, which is considered as a characteristic physical constant (about 5×10^9 times smaller than that of copper) for the range of field-intensity usually employed, should feel the effect of an elastic deformation, as in 1896 Bucherer was believed to have observed. (Wied. Ann. 58,573-1896): "Dagegen konnte ich feststellen, dass eine Erschutterung . . . einen Strom hervorruft."

If a direct current is sent into the ground by means of a two-electrode disposition, and if artificial seismic waves are produced by explosions or shocks of falling masses, in the limits of the electric measurements, the resistivity of the soil keeps during the arrival of the vibrations of ground, such oscillatory values that their record can be compared to a real "seismogram."

New Possible Applications

The discoverers of this seismic-electric correlation of the ground are believed to have found a new effect, but if the effect is not new in the physical literature, it is certainly new in the possible geophysical applications.

In a recent paper, "Die Ursachen des Seismisch-elektrischen Effektes" (Zeitschrift fur Geophysik, Jahrg. 13, Heft 2/3, 1937), v. Thyssen, J. N. Hummel and O. Rulke, express the opinion (which is shared by us) that even if an elastic vibration of ground can be reflected in oscillation of a direct current sent into the ground (as it is practically observed), nevertheless, we are not in the presence of a new physical effect, because the phenomenon finds its logical explanation in already known electro-chemical effects. This critical study, although not definitive, as further developments will show, consists of analysis of all possible causes of the phenomenon which are connected with the existence of ground-energizing electrodes and its proceeds closely by exclusion.

Act As Contact-Seismometer

The electrode could, indeed, enter into vibration, in consequence of the vibratory shock and act, therefore, as "contact-seismometers." But anyone who has occupied himself a little with the construction technics of seismometers knows how difficult it is to realize a seismographic contact such as can be employed for the records by field vibrators.

To the end of eliminating all doubts about a contact seismographic effect, heavy electrodes were used, with variable weight and constant surface, in order to vary rationally the experimental conditions. From the results of such experiments the conclusion may be drawn that the seismic-electric effect is independent of electrode weight.

Thus the use of plate electrodes has further confirmed that the ascertained current variations are not to be imputed to the vibrations of electrodes, which may be cylindrical, flat, light, heavy.

The German authors have also varied the nature of the ground interposed between the electrodes, in order to see whether the sensitivity of the recording disposition would be influenced. Notwithstanding that the specific conductivity of the ground had been remarkably varied between the electrodes, the same results were always obtained, if the current output were constant.

Should Have Used Quadripole Disposition

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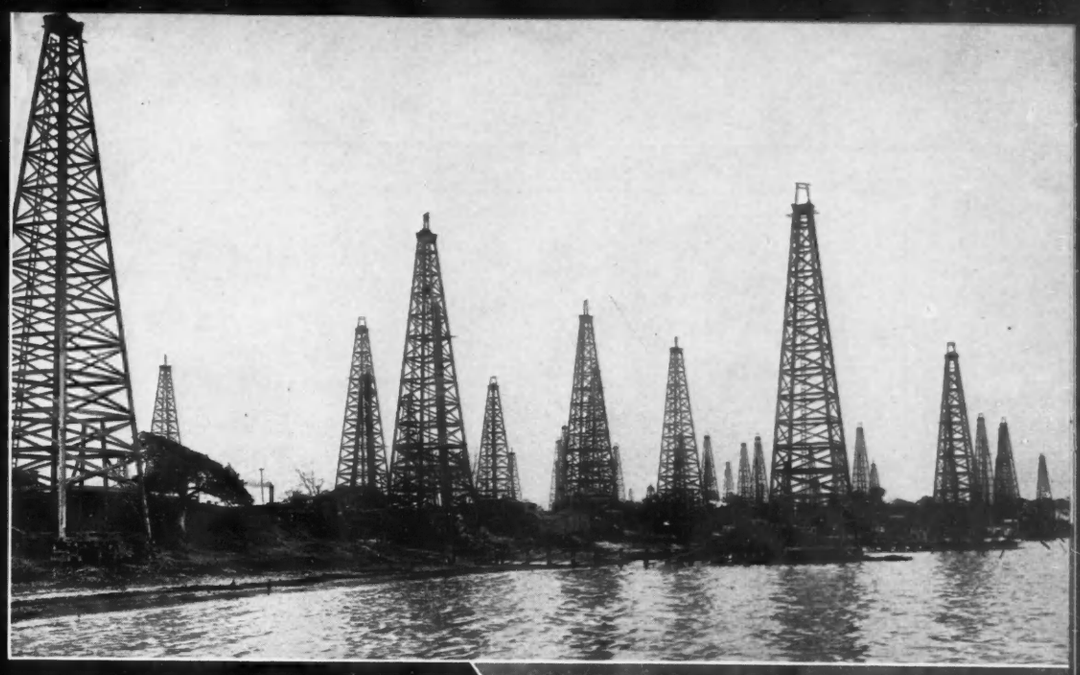
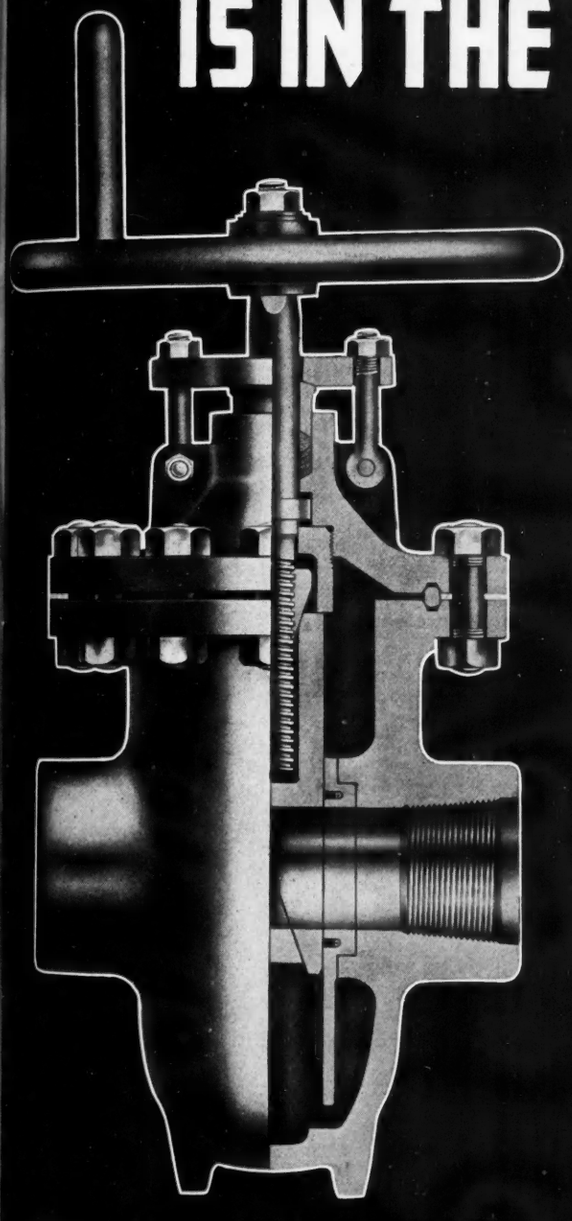


IS IN THE TOOLS!



We know of no better comparison between this Through-Conduit Lubricated Gate Valve and conventional gate valves than the development of 1917 vs. 1937, depicted here. Around the world the W-K-M Gate Valve is the one gate valve embodying those refinements and improvements which definitely eliminate 95% of your gate valve trouble

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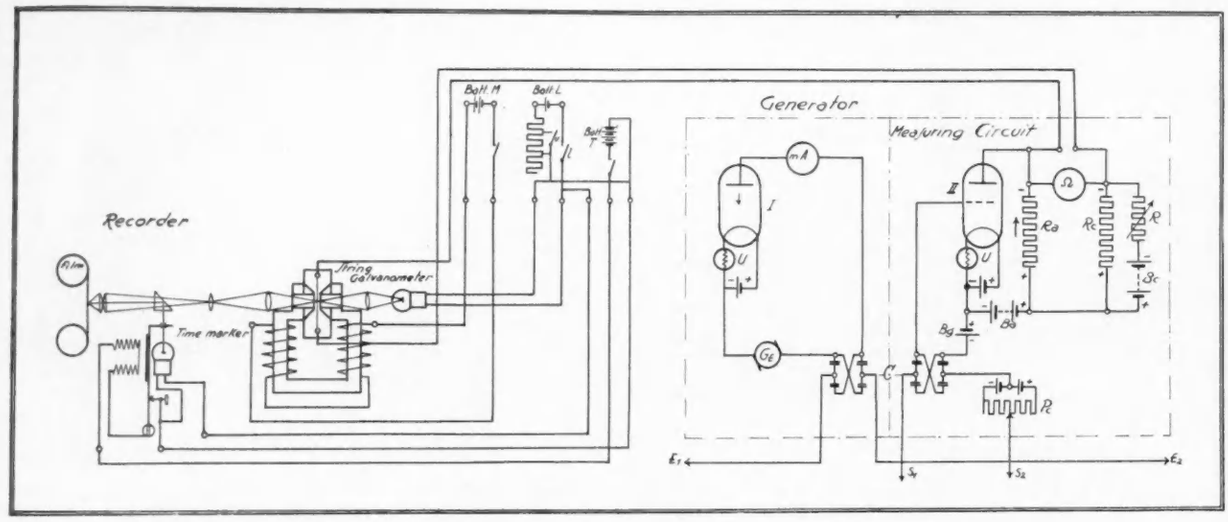


The receiver, showing the voltmeter and photographic self-recorder of ground resistance.

meter with photographic self-recording) for the measurements between the current output electrodes. Finally, it remains only to think of electrochemical alterations on the contact surface between electrodes and soil which are caused by the elastic waves, such as to facilitate or hinder the passage of current.

This phenomenon has been observed already by several authors, particularly in the influence of ultra-acoustic vibrations, and it was studied by Nernst as early as 1899 (in electrolytic processes).

Salt Water Decreases Effect

The more rational idea occurs that the effect must have its cause in the region which surrounds the electrodes, these included.

If salt water is used in making the ground contacts (cadmium, carbon, steel, platinum electrodes), we note in fact that the seismic-electric effect decreases. Laboratory experiments, with an electrolytic cell, have demonstrated that the effect has not a deep or subsoil origin; increasing the ionic concentrations on the ground contacts, the effect decreases until it vanishes entirely.

The elastic waves, caused by the artificial earthquake, can influence chemical reactions in the fluid phase, depolymerizations of colloids, and thus vary the specific properties of the material. Also other processes occurring on the separation surface between medium and electrodes can be influenced in consequence of variation of the contact tensions, polarization potentials, decomposition tensions, electrokinetic potentials.

But independently of the exact definition of this effect, we must not forget that it exists and it is already the object of experimentation. If it is important to define this effect, in order also to utilize it to the highest degree; it is also important to pass to the applications, because it may cause a revolution in the seismographic technics, which are still so defective; inasmuch as the new electro-elastic seismometers have no inertia masses.

It is evident that if the effect has been observed in the direct current generator circuit itself, in contact with the ground, (owing to electrochemical causes connected with the contacts of the ground), it must be observed in any proper measuring circuit, in the energized area. A simple voltage meter could be used (which could serve also for electric resistivity measurements), a thermionic voltmeter, with high sensitivity, regulatable by the triode amplification, which is necessary, because the current density at the electrodes is proportional to the maximum amplitude of the effect, and it is much smaller than that at the electrodes of the generator circuit. This and similar apparatus should act as veritable electro-elastic seismometers. A complete (electro-elastic) seismometer will consist therefore of one generator and one measuring device with optical recording, and at the same time it can serve also for direct current measurements of underground.

Layout of Equipment

For the sake of convenience, generator and measuring device may be assembled in one small box, portable by hand; the batteries and the photographic self-recorder may be arranged in two further boxes, also portable by hand.

The generator is composed of:

(1) A direct current generator group, which is suitable for conveniently energizing the ground (tension at the terminals: 150-300 V.; output: 100-200 watts);

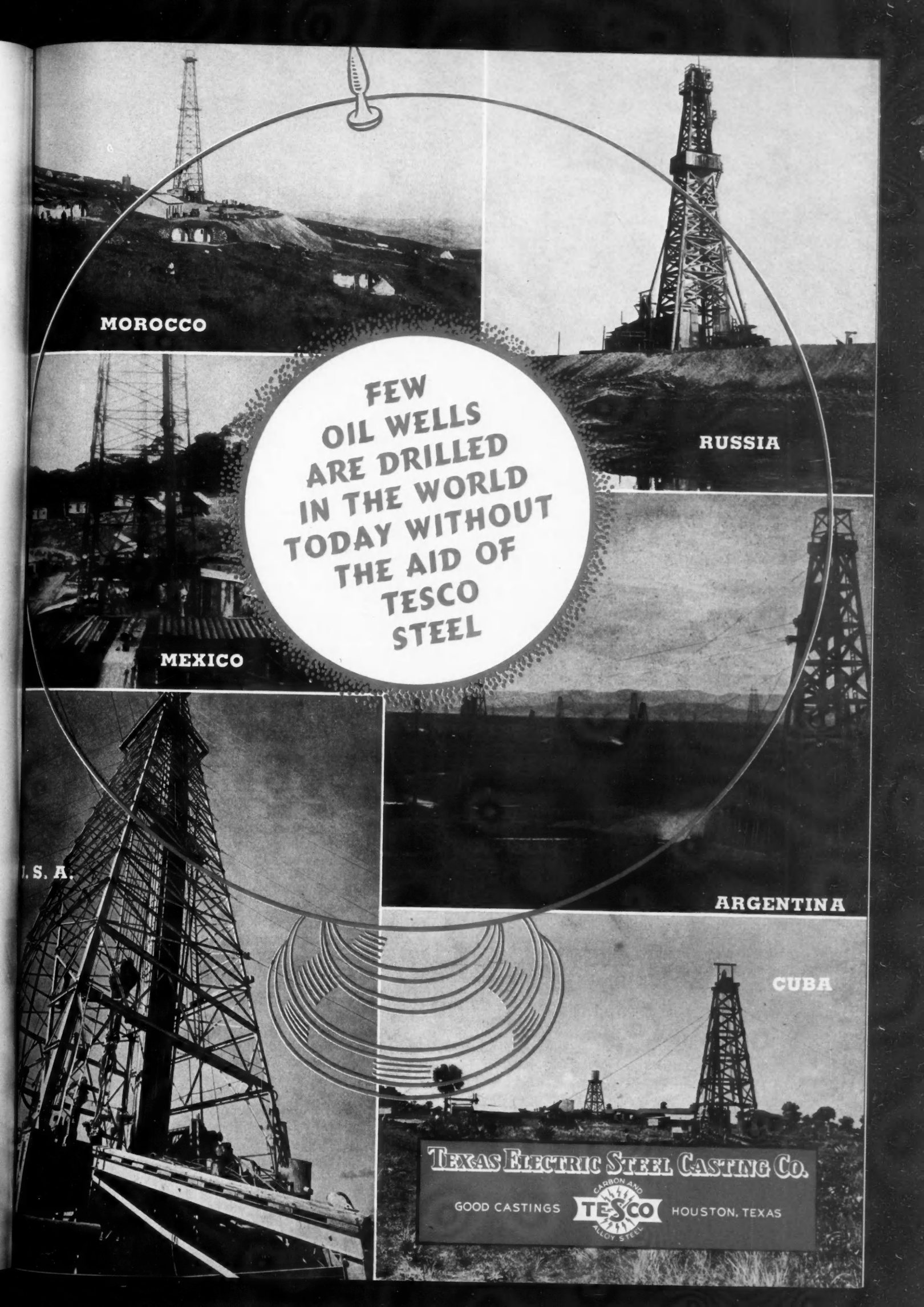
(2) A diode R.G.N. 2004 or R.G.N. 1054 Telefunken or an equivalent one, eventually 2 or more in parallel, according to the necessary output (in order to reach the maximum voltage of 300 volts for instance), an output current of 150 ma. for the R.G.N. 2004 tube, 75 ma. for the R.G.N. 1054;

(3) A dry-cell or storage battery for the filament with a ballast resistance U in series (iron in hydrogen);

(4) A milliameter ma. for observing the current intensity in the generator circuit:

(5) A reversing switch for reversing current polarity.

In general, in order to energize average depths of a not too dry ground by direct current, a generator


MOROCCO
RUSSIA
FEW
OIL WELLS
ARE DRILLED
IN THE WORLD
TODAY WITHOUT
THE AID OF
TESCO
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MEXICO
ARGENTINA
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CUBA
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with the preceding characteristics is sufficient, and it is not necessary in this case to reach greater depths.

If the seismic-electric phenomenon had had the meaning attributed by the American authors, then also the question of the depth electrically involved would have arisen. If a greater current output is needed, it is sufficient to dispose in parallel in the generator circuit two or more diodes, or to substitute the diodes by other ones of greater output.

Cautions To Be Taken

Since the characteristic (I, E) of the diode depends on the increase of filament and of plate voltage, it is eminently necessary to keep the plate voltage sufficiently high in order to obtain the saturation current of an invariable characteristic. These cautions must be taken in order to conduct all experiments under the same conditions of ground energization, to obtain a constant direct current sent into ground, so that once established, this constant output of current remains unchanged, even if oscillations of condition (regimen) of the generator group take place variations of the resistance of the ground contacts. This may be done by the insertion of a diode in the generator circuit, so that a variation of the plate voltage, (when this voltage is in the region of saturation owing to the above-mentioned causes), does not involve any variation of the intensity of the output current.

A voltmeter and a photographic self-recorder of ground resistance are the essential elements of the receiver, which is illustrated in the accompanying figure.

No Current Pick-Up

The voltage meter consists here of the circuits of a triode, the grid circuit of which is in contact with the ground at the voltmetric pick-ups.

A potentiometer is set in series in the grid circuit in order to do the compensation of the spontaneous electrical polarization at the stakes.

In the plate circuit is inserted a suitable fixed resistance R_a; a ballast resistance U, as for the diode, has been used for the filament.

In such a way it is possible to measure the tension of ground without pick-up of current from it, and a high sensitivity is reached by means of the triodic amplification. In order to pick up no current from soil, the grid has a negative voltage because of suitable batteries Bg, the voltage of which must exceed by 3 or 4 volts at least that of the voltmetric pick-up; so a thermionic static voltmeter is realized, as no current flows in the grid circuit.

By the Battery Ba, a suitable plate voltage is obtained, so that a current from anode to the filament is set up. A current flows then in the plate circuit, this initial current I_a, being a function of the grid and plate voltages. This initial current, even if it can oscillate in the straight and negative part of the characteristic (grid tension, plate current) as constant as possible, for the negative values of the grid voltage must be kept, and this may be controlled by the usual voltmeter.

Apparently no current flows through the grid circuit, owing to the polarity of the cell feeding the grid circuit itself. The variations of tension of the pick-up at the ground (amplified by the triode) determine a variation of the initial current, which must persist in the straight part of the characteristic and oscillate symmetrically with respect to the point index of the initial current when the polarity of the pick-up is reversed.

Compensation Device

This variation is measured in the plate circuit, when a fixed ohmic resistance Ra is in series. If we will measure only the tension variations of ground, (due to the seismic-electric effect), we can use a compensation device like that shown in the preceding figure.

Since the energizing current is constant, in the optical recorder the ohmic resistance of ground is directly recorded, and in this case this resistance is oscillating (electro-elastic seismogram).

The studies on this argument are only beginning, but they form preeminently the experimental geophysical novelty of the last two years, and on this it will be necessary to dwell, with studies and suitable research.

Old Cap Carter

puts a steel mill to work

A million American dinners tonight, of delicious deep-sea fish, would never be eaten except for steel. First the old fisherman must mend his nets with a steel needle. Then he puts to sea in a steel boat, unloads his catch into a steel trough, cleans and prepares the fish with steel implements, and finally ships the fish in steel cans plated with tin.

Last year American housewives opened many thousands of tons of these cans .... you could almost say we would be without sea food if it were not for steel.

In the lives of every one of us, steel plays a vital part. That fact is never for a moment forgotten at Youngstown, and research goes on continuously, to keep down the costs and increase the value of the countless steel products you use every day.

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Loading Explosives

INTO WELLS BY PRESSURE

Aids Production

By F. R. COZZENS
Equity Oil & Gas Company

EVERY producer of crude oil or gas has his own pet method of shooting newly drilled wells. Strict adherence to the various pet formulas has ruined at least a third as many wells as were benefitted, and many tons of explosives have been wasted in an effort to correct conditions which existed only in the operator's mind. Nowhere else is this result more plainly marked than in the shallow-sand fields of Ohio and West Virginia. But in the process of redrilling these fields, economical reasons have compelled a more careful study of well shooting, and operators are finding out that an effective shot means more than placing a certain amount of nitro-glycerine or gelatin against the sand-face. For actual profit it means forcing the explosive as far back as possible into the body of the sand.

All producing sands, regardless of depth or texture, contain numerous fissures, seams, and soft spots, which are determined easily by the drill. When a shell of explosives is lowered to the bottom of the well in the usual manner, these fissures remain empty or only partially filled with fluid. When detonation takes place, all such cavities absorb more or less concussion, thus reducing pressure upon the rock. A more damaging feature is that force within a cavity is always directed outward, and following the line of least resistance fluid is thus forced farther back into deeper recesses in the sand. This is why many wells fail to respond with flush production after shooting.

Use of Air Pressure

To remedy this condition, certain operators have made a practice of dumping a quantity of liquid explosive into a well before placing the shell. This method is wasteful, and only partially successful. A far more efficient method, and one that is rapidly coming to the front in shallow sand districts is to force explosives into the rock by outside pressure. When an air compressor is available on the lease, the loading process is accomplished by releasing the required amount of liquid explosive into the well by means of a specially constructed shell with a trap opening in the bottom. About one tenth more explosive is used than would otherwise be necessary in a sand-face of a given thickness. After the empty shell has been withdrawn, and the detonator lowered on the end of an insulated connecting wire, the operator pushes a "cap" down upon the charge. The cap is a wad of felt or other bulky material, and its purpose is to confine floating particles of the explosives. He next pours in sufficient water to anchor the charge, the usual amount being three barrels. A two-inch air line is then connected with the compressor, and air is forced down the hole with all possible speed until pressure at the casing head registers 800 to 1000 pounds. At this point, pressure is released, full volume from the casing, connections removed, and the charge fired electrically.

Three or four hours additional time are required for this procedure, but in practically every case the operator finds that combined application of air and water has forced explosive material into all openings along the sand-face. This has resulted in a more uniform pressure, better rock breakage, and oil, instead of being forced back into the sand, has been held within the explosive zone where it can drain more readily into the well.

Use of Drill for Pressure

Where air compression is not available, the necessary pressure is applied with the drill. The cap or binder is forced down upon the charge in the regular manner, but instead of pouring in water, the necessary anchor is composed of sand, sawdust, or finely screened gravel. About 200 pounds of such anchor is used. A buffer made of rubber or a block of wood is clamped over the drill-bit, and the drill applies pressure until the anchor is tamped hard and firm. Detonation is accomplished by placing electric blasting cap connected to shot wire in a three-foot section of wood, the end of which is sharpened to a point. These detonators are constructed on the job and are lowered down the well by connecting wire, pointed end down. The drill, with rubber buffer attached pushes the point of detonator through the anchor until it contacts the explosive. An electric spark sent down the wire from an outside battery fires the charge.

Gelatin, and similar types of semi-solid explosives are given preference over liquid nitro-glycerine by many operators because of low cost and ease of handling. While these materials cannot be forced into sand fissures by air pressure, excellent results are being secured by using the drill in the manner described for "N.G." Package explosives being less sensitive, can be pressed against the sand-face with sufficient firmness to seal all ordinary openings. A quart of tallow, lard, or fish-oil, added to each 100 pounds of explosive aids greatly in securing proper compression.

Regardless of the type of explosive used, sufficient tests have shown that benefits derived depend upon the volume of sand affected by the blast. The rule holds good in any sand formation. By applying pressure, 10 to 40 percent more volume is secured, and in a majority of cases this margin of difference is sufficient to turn a stripper well into a paying producer.

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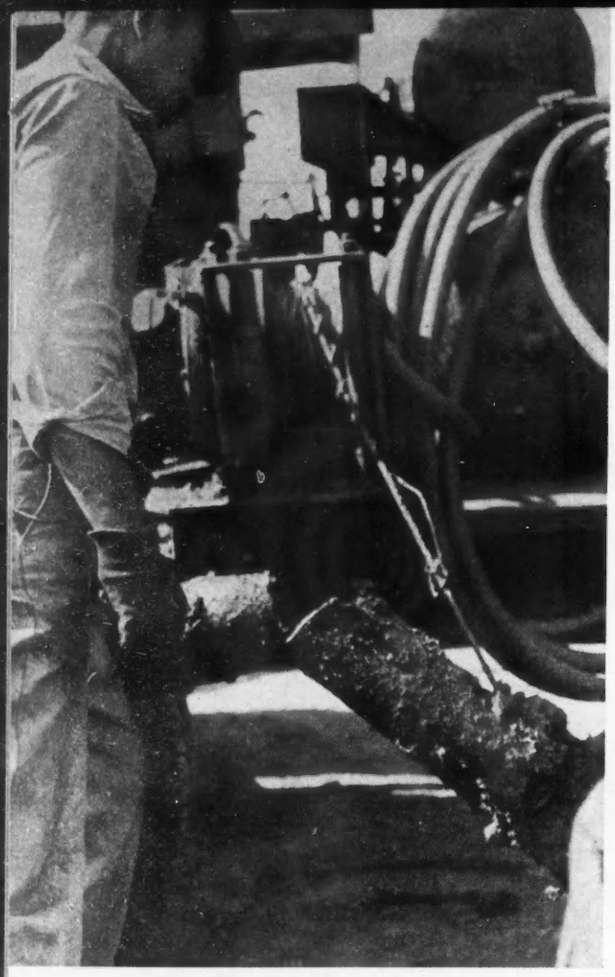


Hot Spots

IN NATURAL GAS DISTRIBUTION LINES

Replaced

WITH

Minimum Expense

By FRANK B. TAYLOR, Staff Writer

A single control operates the winch as the pipe is being removed from the ditch. The winch is actuated by compressed air delivered from air tank beneath hose in picture. Note the break in the pipe, evidence of corrosion.

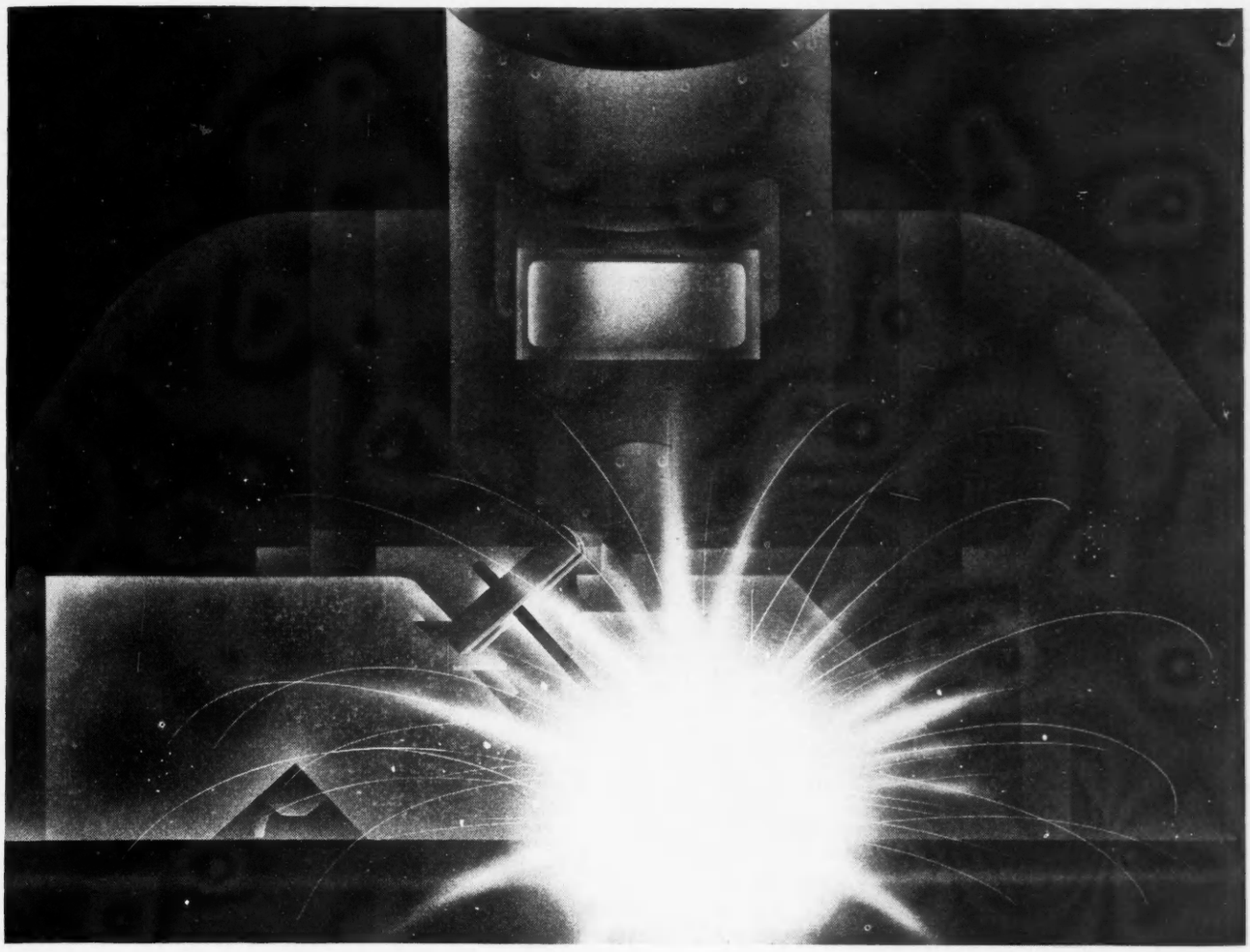
Below: Four and one-half inch pipe being removed from a particularly "hot" spot after more than 12 years of service. Even being in the condition shown, natural gas at distribution pressures had been passed without prohibitive loss. Hardly more than "a hollow streak of rust," the line showed varying degrees of deterioration, the worst section of which is shown.

ONE division of pipe line work that is never finished is the maintenance of fingering gas distribution systems. Minor extensions and replacements are constantly on order, with the checking of reported leaks and points of danger a continuous part of the maintenance work.

Oklahoma Natural Gas Company, in making a recent repair to a section of an existing distribution system, demonstrated one practical and economic procedure in replacing condemned line.

Highly Electrolytic

Prior checking of the line showed that the ground of the vicinity was highly electrolytic in action on metal. This condition was to be expected from the character of the earth of the area, which paralleled a highway of Tulsa County near



For new requirements . . . MOLY steels

WITH the decided trend toward higher steam pressures and temperatures, there is also a growing tendency toward welded pipe-line assemblies.

Carbon-Molybdenum steel is being used more and more extensively in steamline construction because it meets the stricter present-day requirements: It has good creep strength and retains its strength at elevated temperatures. It lends itself to welded construction. And — its cost is so low, in comparison with its advantages, that in the end it is really the most economical steel for the purpose. In a weldability investigation, tests showed:

At room temperature Carbon-Molybdenum steel was 10% higher in tensile strength and 20% higher in yield point than Carbon steel;

At 950° F. the drop in these qualities respectively was 14% and 15% for Carbon-Molybdenum and 31% and 34% for Carbon;

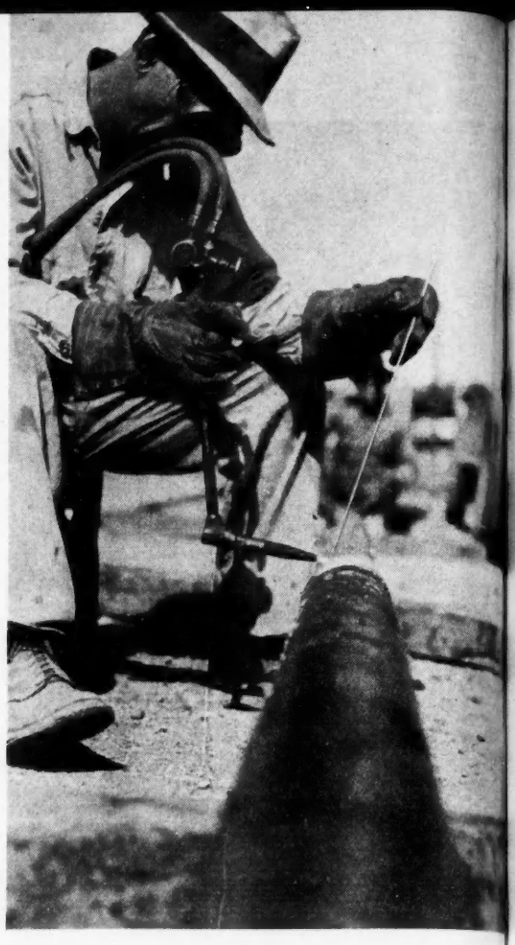
At 1050° F. the drop in both qualities was 24% for Carbon-Molybdenum and 50% for Carbon.

Our technical book, "Molybdenum," will prove useful to engineers and production heads interested in cost cutting and product improvement. Our monthly news-sheet, "The Moly Matrix," keeps readers informed on Moly developments. Both sent free on request. Our laboratory is available for the study of special ferrous problems. Climax Molybdenum Co., 500 Fifth Ave., New York.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company

MOLY



At left: L. T. Miller, winch operator for Oklahoma Natural Gas Company, handling the truck-mounted, single-speed winch removing condemned line from the ditch.

At right: Completing a 4½-inch bead around replacement gas pipe. Welder Williams is handling the torch for Oklahoma Natural Gas Company.

Below: A complete weld made by rolling the pipe through 345 degrees. The crown bead shows sufficient metal, and the texture and side heat shows sufficient uniformity for a leakless weld. The tie-in is definite, being wide and highly crowned.

Tulsa; the path of the line was through a regional low; and moisture in excess of the ordinary was prevalent. When the line was removed from the earth the effect of the corrosion denoted anodic electrolysis, due probably to local stray currents and accelerated by self-corrosion through lack of sustaining protective coating.

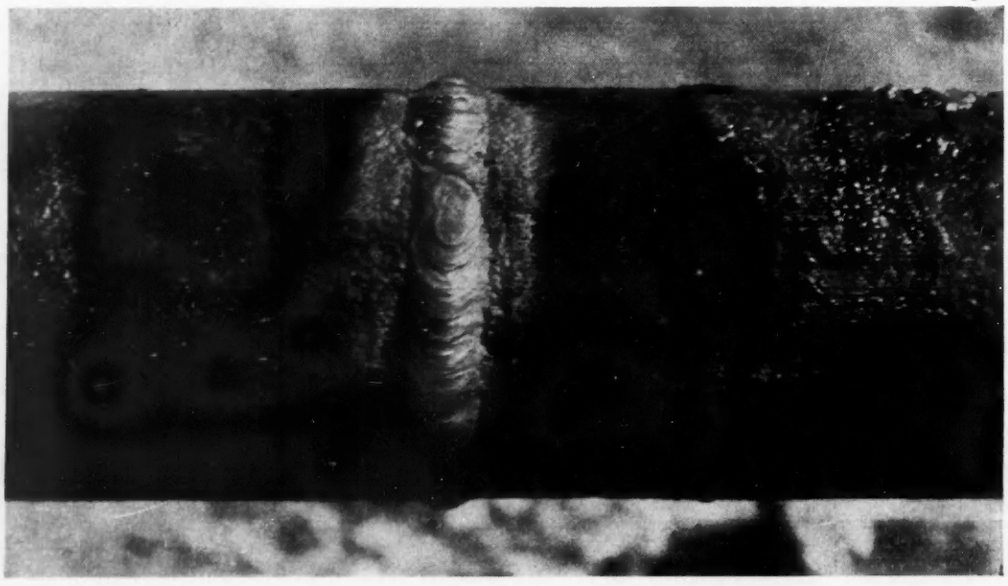
Everything Handy

One of the first steps in preparing to make the line replacement was to install by-passes or consumer connections to assure non-interruption of service during the work. All equipment was moved to the location before the work started. This included replacement pipe, and skids for welding of sections, etc. This item, the preparation and transportation of equipment to points of comparatively minor replacement, is a cost that is frequently entirely out of proportion to the size of the job.

To make the change, the old ditch was cleaned by machine, and the pipe to be replaced being stripped as close as practical. In this particular instance, the depth of the dug ditch was about 2½ feet, leaving only a few inches of dirt over the line.

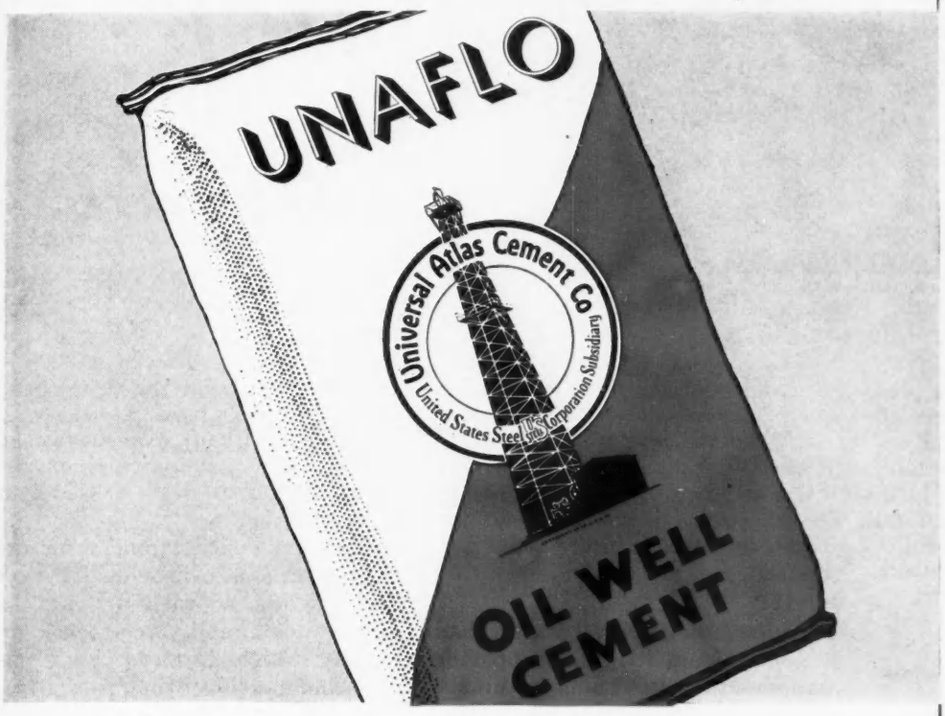
The initial break was made in the line by going under with a winch line. From this start the line was progressively removed by winch, mounted on a truck driven parallel to the ditch. As some of the pipe was removed from the ditch, that which had not been directly lifted would be pulled free, and would afford a new purchase for the hook. In this manner, using a compressed air driven, single speed winch, the 5½-inch old line was speedily recovered.

Tie-in with the system was made with reconditioned 4½-inch pipe, welded into sections as the condemned line was removed. An asphaltic coat was applied over the replacement pipe. Welding was rolled on skids and by wrench.



NEW WORLD'S RECORD

in oil well cementing!



1500 bags of Unaflo cement pumped 11,342 feet with maximum pressure of 1400 pounds per square inch

Here are the quick facts on the most outstanding oil well cementing job to date—

Total depth of well—11,342 feet. Bottom hole temperature—236° F.

1500 bags of Unaflo mixed 15.8 pounds per gallon with two Halliburton trucks.

Mixing time—35 minutes.

Pumped down with two 20″ slush pumps (6″ liners). Pumps not compounded.

Pump-down time—18 minutes and 15 seconds.

Plug landed with maximum pump pressure of 1400 pounds per square inch.

No ice used.

Cement drilled from plug was hard and dense.

These low pump pressures signify:

1. Unaflo cement retains fluidity at highest known oil well temperatures.
2. Unaflo cement goes into place as a fluid cement slurry.
3. After it sets up, Unaflo slurry forms an impermeable seal against migrating subsurface fluids.
4. Unaflo cement is the economical oil well cement.

Try it on your next job!

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A Cement for Every Oil Company Use at Oil Well, Refinery and Filling Station

Atlas portland cement for *surface* work and for cementing *surface* casing. Unaflo cement is recommended for *deep* well work.

Lumnite cement is used in Oil Refineries for making Refractory, Insulating and Heat-Resistant Concrete Linings in Still Furnace Walls, Bottoms, Roofs, Foundations; Ducts, Flues and Stack Linings; Tube Sheet Insulation.

Lumnite cement makes Corrosion-Resistant Concrete and Mortar Lining in Distillation and Cracking Units; Re-Run Stills; Absorption Systems; Chemical Treating and Ethyl Plants.

Atlas White the cement that is pure *white* and non-staining. Exceeds specification requirements for portland cement strength. Ideal for ornamental work in connection with service station construction and repair.

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CEMENTS

STURDY UNITIZED

Oil Drum Rack

HAS ADVANTAGES

By M. T. PATE

STRONGLY braced and welded from extra heavy 3-inch pipe to withstand the severe strain of being dragged aboard a truck and transported between drilling locations, the oil drum rack used on George B. Barham's Whitfield 1 has a number of advantages which might be applied on other jobs.

The three drums are each painted a distinctive color, so that identification of contents may be made from the appearance of the drum, without the usual wasteful sampling of from half a pint to a gallon as the contents is examined to be sure of the kind being drawn.

Each individual drum cradle is pivoted just above center, so that even a full drum will automatically return to the upright position when released, yet a container will readily rotate even when practically empty. A pin, passing through holes in trunnion and bearing sleeve, provides for locking the drums upright; a precaution preventing possible damage during moves.

Made three inches longer than standard drum length, to provide easy changing of drums, a threaded bolt, bent to form a crank handle, bears through the upper cross member on each drum to clamp it firmly against the base and prevent slipping while drawing contents, thus eliminating another frequent cause of wastage.

Undue strain on the drum head and clamping bolt in case the rack is allowed to cant over backward is taken by a chain which passes around the drum and is held taut by a turnbuckle.

Eight-inch sled runners on the ends of the base provide for easy skidding of the rack around the lease and simplify the task of loading. Where ground conditions permit, the grid of pipe forms sufficient base to insure stability of the rack without the need of auxiliary blocking, the trunnions being planned to come at such a height that the usual containers may be filled from the spigots without additional height being required.

This welding oil drum rack saves oil, time and possible mistakes on the job, and is easily shifted between locations as a unit.

MEN IN THE INDUSTRY'S NEWS

FREDERICK G. CLAPP has left Iran to spend some time with the geologists of the Inland Exploration Company now in the field in Afghanistan.

J. EDGAR PEW, vice president in charge of production for Sun Oil Company, Philadelphia, accompanied by Mrs. Pew, spent several days in Dallas the past week.

FORD TURNER, assistant manager of the land department in the Fort Worth division of The Pure Oil Company, has been transferred to Saginaw, Michigan, to become head of the land department of the Saginaw division.

JOHN W. GILLILAND, head of General American Oil Company, is moving general offices of the company from Shreveport, Louisiana, to Dallas, Texas, to be closer to company operations in East Texas field.

W. W. STRIKLER, founder and one-time owner of the Lubrite Refining Company and now engaged in development in the Illinois Coal Basin area, has been elected executive secretary of the St. Louis Co-Operative Club.

LAWRENCE J. STEWARD, United Fuel Gas Company with headquarters at Charleston, West Virginia, has been named vice president of the Charleston chapter, West Virginia Society of Professional Engineers.

E. E. Roth, consulting geologist for the Columbia Gas & Electric Company, Pittsburgh, addressed the organization last week.

JAMES McNEESE, Continental Oil Company, Ponca City, Oklahoma, visited in the vicinity of Wheeling, West Virginia, last week. He left the area 27 years ago to become affiliated with oil activity in the midwest.

JAMES B. TEMPLETON, geologist for Deep Rock Oil Corporation at Wichita, Kansas, was a visitor in Tulsa last week.

J. A. LaFORTUNE, vice president, and S. I. Hulse, sales manager, Warren Petroleum Corporation, attended opening ceremonies at the Talco asphalt plant at Mt. Pleasant, Texas, recently.

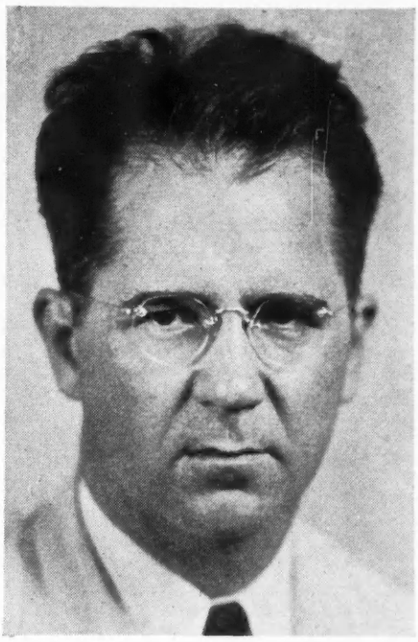
R. W. BOND, production manager for Shell Petroleum Corporation, is visiting oil properties in the vicinity of Amarillo, Texas.

NELSON STORY HOGAN, drilling contractor on Altoba Oils' wildcat test on the Wainwright structure of Alberta, Canada, was in Calgary last week negotiating contracts for other Alberta tests.

MAYNARD J. DAVIES, managing director, and Leonard H. Phillips, secretary, Davies Petroleums, Ltd., returned to Calgary last week from a trip to Toronto. Davies reports a wider interest in eastern financial centers concerning Alberta oil development.

DR. J. H. SAWYER, JR., Beaumont, Texas, is enroute Bogota, Columbia, where he will head a geophysical exploration crew for the Shell Petroleum Company.

Gardescu to Venezuela



DR. IONEL I. GARDESCU

DR. IONEL I. GARDESCU, consulting petroleum engineer and geologist, left recently for Caripito, Venezuela, making the trip by plane. He expects to be gone about a month on an inspection of the Goanoco asphalt lake area. With him are James C. McIntyre and Leo Petrie.

Dr. Gardescu was born in Bucharest, Roumania, and came to the states a few years after the World War. He received his degree in geology at the University of Pittsburgh and was later a professor there in the department of oil and gas production. For his work in controlling the gas bubbles that develop in oil reservoirs, he was given the degree of doctor of philosophy by the University of California, the first person so honored in the field of petroleum engineering.

In 1933, while teaching at A. & M. College, he was assigned by The Texas Company to special work on the Hogg vs. Texas Company suit. In the preparation of the technical evidence to be used in the case, Dr. Gardescu originated the index card system of correlation.

CLINT W. and DON W. JOSEY, officials of Rancho and Gem Oil Companies, and Monroe H. Goode, all of Dallas, have returned from a successful big-game hunt in the wilds of the Black Range, west of Hot Springs, New Mexico. En route home, the party stopped off in Southwest Texas and added other trophies to their bag.

CHESTER W. WASHBURNE has returned from field work in Venezuela. He has moved his office from 149 Broadway to 50 Church Street, New York City, where he also will handle the consulting work of Frederick G. Clapp during the absence of Clapp in the Near East.

F. A. CALVERT, president, heads the list of 11 directors of the Oil & Gas Association of Michigan, whose terms expire December 6, on which date new directors will be chosen at the annual meeting to be held in Mt. Pleasant. Other directors whose terms expire are Haswell W. Grant, Robert W. Atha, Crawford Daily, James C. Graves, Isaiah Leebove, J. W. Leonard, Jr., C. C. A. Beels, George W. Myers, Edward Stewart and Karl H. Schilling.

The organization's nominating committee has submitted names of the following 19 members from which the new directors will be chosen: W. B. Pardoe, Guy Chapman, William Cline, R. E. Clinton, Kurt DeCousser, Joseph Drury, Delbert Fortney, Walter Russell, George Scheid, Fred Stork, Charles Strange, Alving Weber, J. V. Wicklund, Kay Hunt, Harold McClure, Carl Myler, Robert Newcombe, Bert Ridgeway and Virgil McClintic.

E. G. DAHLGREN, director of the oil and gas conservation division of the Kansas state corporation commission, addressed members of the Kansas Geological Society meeting in Wichita last week on "The Importance of Kansas as an Oil Producing State."

WALTER P. WILSON, geologist, left the United States on November 10 on the S. S. Hamburg on his way to Iran, where he will be engaged in geological work for the Amiranian Oil Company. His address will be 10 Khiaban Nosrat, Teheran, Iran.

H. C. MILLER, senior petroleum engineer of the San Francisco office of the Oil and Gas Division of the United States Bureau of Mines, has returned to his headquarters. Miller made a Mid-Continent and Eastern trip in connection with bureau activities.

DON TILLEY, pipe line foreman of Mene Grande Oil Company, will sail from New York early in December for Maracaibo, Venezuela, after a three months' vacation in the United States.

C. B. BUERGER of Pittsburgh, vice president of Gulf Refining Company, spent several days recently at the company's refinery at Port Arthur. He also enjoyed a few days hunting while in Texas and Louisiana.

JAMES C. LINDSAY, assistant to H. W. Sansom, manager of Cia. Mexicana de Petroleo "El Aguila" S. A. at Tampico, Mexico, was married to Mrs. Virginia Hudson at Laredo, Texas, on November 1. They will make their home in Tampico.

HAROLD BOYD, chief scout for Magnolia Petroleum Company, Dallas, is vacationing in New Mexico.

G. O. LOCKWOOD, safety engineer with Cities Service Oil Company at Bartlesville, presented a paper, "A Supervisor's Responsibility," written by John E. Howell, at a Mid-Continent Petroleum Safety Council meeting November 23 at Stillwater, Oklahoma. The meeting is the

second in a series sponsored by the organization and will be presented at the Oklahoma Agricultural & Mechanical College at Stillwater.

HARRY M. "SWEDE" NIELSON, geologist with Gulf Oil Corporation in Mexico and Texas for the past 15 years, has resigned to accept a position with Plymouth Oil Company in Texas.

N. W. HUNTER, Houston, spent Thanksgiving on his ranch near Kerrville, Texas.

C. P. CHISHOLM, scout for The Pure Oil Company, Houston, is on his vacation.

R. C. HILLYER, chief engineer of Mexican Gulf Oil Company at Tampico, Mexico, is visiting in Texas.

C. R. BENDER, 45, of Houston, scout for West Production Company, was critically injured November 20 in an automobile accident near Houston. He suffered a head injury that caused paralysis in the right side.

DIED:

KENNETH R. KINGSBURY, president of Standard Oil Company of California, died from a heart attack the night of November 22 on the Grace liner Santa Paula, as it was enroute through the Panama Canal.

Kingsbury was a native of Columbus, Ohio, and was 61 years of age. He graduated at Princeton University in the class of 1896, and then took a mining engineering course at Columbia University the following year. Immediately thereafter he became an employe of Standard Oil Company of Pennsylvania. He came to California in 1912 to become connected with Standard Oil Company of California, and was elected a vice president, serving in that capacity until 1919 when he became president.

K. R. KINGSBURY

Under his guidance, he has held his company in a dominating position on the West Coast and its scope has widened until the company has important foreign holdings and also is operating through subsidiaries in Texas and other states.

CAPTAIN MICHAEL A. SMIRNOFF, 45, geologist and independent oil operator, died suddenly November 23 at his home in Houston, Texas. And apparently unable to control her grief over his death, his widow, Mrs. Louise Smirnoff, 30, fatally shot herself in a park in Houston on the following day. Captain Smirnoff was born in Russia of noble parents, and as a young officer, served in the Czar's Imperial Guard. In the World War he was captured by the Germans and was held prisoner for three years, before he escaped into Holland. After the Armistice, he fought with the White Army of Russia against the Communists. He later joined the British army and was in Toronto, Canada, when his enlistment expired. From there he went to the Colorado School of Mines and was graduated in geology in 1923. Subsequently, he served as geologist for Roxana Petroleum Corporation, predecessor of the present Shell Petroleum Corporation, in the years 1924-1928; in similar capacity until 1930 for Southern Crude Oil Purchasing Company, now a part of Standard Oil Company of Indiana; and later as an independent operator. He had a sister in Russia, but her whereabouts are unknown to Smirnoff's associates in Houston.

W. J. BOVAIRD, chairman of the board of Bovaird Supply Company, died November 25 at Independence, Kansas. Bovaird moved to Independence in 1903 from Bradford, Pa., where he had engaged in the supply business with his father. He was active in the management of the company until 1925, at which time he became chairman of the board. Bovaird was born at Shamburg, Pa., March 25, 1863. He was a Mason, a trustee of the First Presbyterian Church at Independence, and served as First Lieutenant, Company C., 16th Pennsylvania Regiment, in the Spanish-American War, and saw service in Puerto Rico.

Bovaird is survived by his widow at Independence, and three sons. W. M., president of the company, F. D. and D. D. Bovaird, all of Tulsa. Funeral services interment were at Independence, November 27.

TED BARNES, 35, an employe of Echols & Echols, drilling contractors, was killed November 21 near Oddessa, Texas, by a hit-and-run motorist.

B. C. KING, 65, one of the three men who drilled the discovery well in the Fitts field of Pontotoc County, died at Ada, Oklahoma, November 21 of heart disease. King, a pioneer attorney of the city, came to Oklahoma from Alabama in 1900.

JAMES MADISON, 53, independent oil operator and geologist, died November 21 at his home in Wichita, Kansas, of a heart attack after an illness of nine months. He is survived by his widow, Mrs. Virginia Madison.

CONNELL JOSEPH GALLAGHER, 80, engaged in oil development near Kingfisher, Oklahoma, and a resident of Tulsa since 1915, died November 21 of a heart attack. He had retired five years ago. Surviving are five sons, five daughters and one sister.

E. D. RAMEY, 37, rig builder, was fatally injured November 24 in the Gladewater section of the East Texas field when he fell from a derrick.

Lund Kills Deer With Bow and Arrow

Many deer are being killed this season, but few are being brought down with a bow and arrow. Consequently, Gage Lund, superintendent for Standard Oil Company of Texas, was overly pleased on Armistice Day when a perfect arrow shot just back of the shoulder dropped this six pointed deer at 50 yards. The thrill of the experience was shared by other members of the party who were: C. L. Clausel of A-1 Bit Company; E. G. Thompson, of Housh & Thompson; Luther Patterson; Bill Symonds; Frank L. Ross; R. J. Voss and E. L. McHenry. The party hunted 20 miles southwest of Mason, West Texas, and bagged a total of 9 bucks in four days.

More Settled

Downward trend of gasoline prices seems halted and crude structure remains firm.

THE oil industry's markets lately have become appreciably more settled, following earlier weeks of declining prices and threats of declines; and it now appears that the losing of ground may have been halted, at least temporarily.

The gasoline market, main weak segment in the general situation, finally has begun to develop some resistance to the forces pulling prices down; and quotations late last week were largely about the same as a week previously, although in a few exceptional cases, minimum prices were an additional one eighth cent a gallon lower than before.

Crude Market Strengthened

The fears of an early break in the crude price structure have been largely allayed, by the distinctly favorable production-control situation.

The recent drastic cutting back of production in Texas, through lowered allowables throughout the state and through the Sunday shut-down program for the East Texas field, has been especially encouraging. For the lowered Texas output not only has brought crude production for the nation immediately into a good relation with demand; but it also has paved the way for similarly effective regulation of production in December in all the leading producing states, since the Texas example is expected to be generally followed in setting December allowables.

Crude Prices Holding

Crude oil prices have continued to hold generally at the established levels, in view of the strict control program, although local disturbances have continued.

The Pennsylvania grade crude market has suffered a further slight reaction, following previous more important declines. The Pennzoil Company effective November 19 reduced its posted price for Pennsylvania grade crude in National Transit Lines 5 cents a barrel, making the new price $2.30 a barrel. The change affects purchases in the Cochran, Franklin, Hamilton, and Doolittle districts. The last previous change in the National Transit posting was a 25-cent reduction October 11.

Kerosene and Fuel

While the gasoline market has become steadier, the markets for other refined products have remained generally firm at the price levels that so far have held up consistently in the face of the disturbed gasoline situation.

Kerosene prices, however, have become a little less stable, and minimum quotations on certain grades lately have declined one eighth cent a gallon at refineries in Oklahoma and Kansas.

Fuel oil prices, meanwhile, have remained firm, and colder weather last week was a bolstering influence. Since fuel oil stocks are comparatively low, and since a large part of the heavy-consuming season yet lies ahead, the fuel oil market appears to be in a strong position.

Gasoline Market Steadier

The past week was one of encouragement in the gasoline market, since prices proved resistant for the first time in nearly two months.

Tank car prices at refineries remained mostly unchanged, as plant owners began to withdraw quotations on gasoline, pending a more favorable relation of refined product prices to crude oil prices. The large decline of gasoline tank car prices in the past two months finally has left refiners in a position affording little or no opportunity for profits on operations. Plant activity consequently already has been curtailed or discontinued in some instances, and the refiners are asserting that either gasoline prices must be improved or crude oil prices must be reduced, to restore to the refiner normal opportunity for profit.

The recent better performance of the gasoline market apparently has reflected not only this balking of refiners at the low prevailing prices but also a recognition of the probable beneficial effects of the exceptionally strict present program of crude production control. The tightening of the supplies of crude oil naturally is expected to act as a brake on the turning out of further surplus supplies of gasoline.

Fuel Situation Precarious

Nevertheless, the danger still remains that gasoline output may be difficult to hold down within reasonable limits in the next several months, when refinery activity must remain large in supplying the demand for fuel oil for domestic heating purposes.

The ultimate success in preventing an over-expansion of gasoline stocks this winter naturally will depend to a considerable extent on the weather. A severe winter, necessitating heavy use of burning oils, would tend to push gasoline production and stocks too high; while mild weather would tend to hold the gasoline inventories more nearly in line with market conditions.

Gasoline Stocks High

However, the industry is entering this critical period of heavy fuel oil con-

Trends of United States Production and Stocks

Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports.

WEEK ENDED	Crude Oil Production (Barrels Daily)	Crude Runs to Stills (Barrels Daily)	Crude Oil Stocks (Barrels)	Gasoline Stocks (Barrels)	Gas & Fuel Oil Stocks (Barrels)
January 2, 1937	3,121,400	3,030,000	287,659,000	62,661,000	106,330,000
January 30	3,194,050	2,995,000	285,384,000	69,540,000	102,078,000
February 27	3,296,100	3,085,000	288,121,000	78,786,000	99,534,000
March 27	3,431,300	3,060,000	293,587,000	*83,538,000	96,591,000
April 24	3,496,400	3,125,000	300,737,000	82,303,000	94,100,000
May 29	3,573,000	3,245,000	306,445,000	78,758,000	96,139,000
June 26	3,529,600	3,235,000	307,679,000	75,427,000	100,395,000
July 31	3,591,900	3,425,000	308,250,000	70,872,000	108,209,000
August	*3,731,450	3,425,000	309,506,000	66,997,000	112,111,000
September 25	3,666,300	*3,455,000	307,974,000	65,620,000	116,472,000
October 2	3,647,450	3,400,000	309,036,000	65,266,000	117,076,000
October 30	3,602,950	3,345,000	307,140,000	66,836,000	121,070,000
November 6	3,533,150	3,325,000	307,224,000	67,271,000	120,925,000
November 13	3,541,450	3,335,000	305,608,000	67,035,000	121,012,000
November 20, 1937	3,573,850	3,365,000	.....	67,661,000	121,191,000
November 21, 1936	3,060,950	2,995,000	†289,964,000	56,670,000	111,762,000
Change in past year	+16.7%	+12.4%	+5.4%	+19.4%	+8.4%

* All time peak.
† Stocks November 14, 1936.

CRUDE OIL PRICES

Complete tables of prices paid for crude oil at the well in principal fields is shown on page 50 in the issue of November 1. This schedule will appear only in the first issue of each month.

sumption at a disadvantage, as the gasoline stocks already are out of line with prevailing demand. This disadvantage, of course, has been largely responsible for the present low prices of gasoline. And the existence of this disadvantage undoubtedly will result in a continuation of unsteadiness of the gasoline market, despite the fact that the hitherto declining trend of prices was halted last week.

The latest weekly figures did not reveal any important change in the industry's statistical position, and were partly favorable and partly unfavorable.

Crude oil production now is down to a level that should lend strength to the whole market situation, following the cutting back by Texas at the middle of the month.

Runs of crude oil to refinery stills increased 30,000 barrels to an average of 3,365,000 barrels daily in the week ended November 20, and were 12.4 percent greater than in the corresponding week last year. But that year-to-year increase is largely justified, as petroleum demand has been running about 10 percent larger this year than last year.

November quite likely will bring a substantial net reduction in crude oil stocks. The inventories were about 1,500,000 barrels lower on November 13 than at the beginning of the month, and a substantial further decrease is indicated for the latter half of the month, in view of the strict production allowables. The crude oil stocks of November 13, totaling 305,608,000 barrels, were only 5.4 percent larger than those held a year previously, whereas there has been a larger increase in petroleum demand, as mentioned above.

Fuel oil inventories were further increased a little to 121,191,000 barrels in the week ended November 20, and stood 8.4 percent higher than on the corresponding date last year. The stocks still are moderate in relation to demand, however, as the markets have been absorbing about 15 percent more fuel oil this year than last year.

Gasoline stocks were increased about 600,000 barrels in the week ended November 20, to a total of 67,661,000 barrels. The gasoline storage normally increases at this time of year. But the additions to storage commenced prematurely this year, around October 1 instead of November 15, and present inventories are 19.4 percent larger than those on hand a year ago. This percentage by which the storage has been expanded since this time last year is serious, considering that gasoline demand has been showing an improvement of only about 10 percent.

Refinery Prices

U. S. Motor gasoline ranged in the Oklahoma market about as follows: 62 octane and below, 4⅛ to 4½ cents a gallon; 63 to 66 octane, 4½ to 4¾ cents; 67 to 69 octane, 4⅞ to 5⅛ cents; and 70 to 72 octane, 5¼ to 5½ cents.

Prices in the Chicago market ranged as follows: 62 octane and below, 4 to 4½ cents; 63 to 67 octane, 4¼ to 5 cents; and 68 to 70 octane, 4¾ to 5½ cents.

Kerosene prices f.o.b. Oklahoma refineries ranged from 4 to 4¼ cents a gallon for the 41-43 water white grade, and from 4⅛ to 4⅜ cents for the 42-44 water white grade. Corresponding prices in the Chicago market were: 4 to 4¼ cents and 4⅛ to 4⅜ cents.

Summary of Wells Completed in the United States
Week Ending November 27, 1937

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total 1937	Total this Date, 1936
Alabama	1	.....	.....	1	.....	2	2
Arkansas	5	4	.....	1	3,285	128	83
California	27	26	.....	1	13,575	1,354	1,027
Colorado	.....	.....	.....	.....	.....	18	18
Florida	.....	.....	.....	.....	.....	1	2
Illinois	37	25	.....	12	3,940	339	4
Indiana	.....	.....	.....	.....	.....	122	165
Kansas	49	36	3	10	50,425	2,489	1,546
Kentucky	29	10	10	9	311	507	248
Louisiana	12	6	.....	6	2,392	907	930
Michigan	18	17	.....	1	3,511	877	709
Mississippi	1	.....	.....	1	.....	15	8
Montana	3	2	1	.....	275	190	178
Nebraska	.....	.....	.....	.....	.....	.....	1
New Mexico	12	9	.....	3	15,410	636	521
New York	.....	.....	.....	.....	.....	21	.....
Ohio	33	10	12	11	375	1,372	1,781
Oklahoma	49	37	.....	12	11,392	2,733	2,634
Pennsylvania	.....	.....	.....	.....	.....	188	.....
Texas	251	213	.....	38	408,923	13,912	11,514
Utah	.....	.....	.....	.....	.....	.....	.....
West Virginia	39	7	29	3	32	888	569
Wyoming	2	1	1	.....	516	99	86
Total this week	568	403	56	109	514,362	26,798	22,026
Total last week	633	428	86	119	484,913	.....	.....
Total this year	26,798	18,663	2,285	5,850	22,500,576	.....	.....

Comparison of Permits Granted for New Wells

STATE	Week Ending Nov. 27	Total this Mo.	Total this Year	Total this Date Last Year	1936 Year Total
Arkansas	2	18	231	91	103
California	30	140	1,472	962	1,054
Louisiana	29	94	1,162	1,013	1,107
Kansas	43	172	2,534	1,672	1,873
Michigan	17	75	903	677	762
Oklahoma	46	204	2,560	2,625	2,594
Texas	236	1,005	16,003	13,916	15,582
Total	403	1,708	24,865	20,956	23,075

Output Drops Considerably

United States production declines 134,850 barrels daily, due largely to Sunday shutdown of the East Texas field.

REFLECTING a recent Texas state order, prohibiting production in the great East Texas oil field for four consecutive Sundays, United States crude oil production in the past week, ended November 27, showed a sharp drop of 134,850 barrels, averaging 3,430,475 barrels a day, which was 78,525 barrels daily less than the Bureau of Mines recommendation for November.

The sharp decline in last week's production resulted mainly from greatly reduced production in Texas and Oklahoma, as well as smaller outputs in California, Louisiana and Arkansas, which considerably outweighed small increases in Kansas and other states.

Texas last week averaged 1,317,200 barrels daily, which was 104,800 barrels a day less than in the previous week, 96,100 less than the Bureau of Mines estimate, and 34,477 barrels a day less than allowable originally prescribed by the state for the month of November.

Oklahoma Down

Oklahoma likewise showed a sharp drop of 22,200 barrels, the average output having been 567,825 barrels a day. That was 30,175 barrels less than the indicated demand and 7175 less than the state allowable.

California output was down 9000 to 705,000 barrels daily, having been 30,400 barrels a day in excess of the Bureau of Mines recommendation and the recommendation of the Central Committee of California Oil Producers.

Louisiana also slightly decreased its production to 244,125 barrels daily, which was 1050 barrels a day less than in the previous week, 2075 less than the indicated demand and 9025 barrels daily less than the state allowable.

Kansas Up

Kansas as the only main producing state showed a small increase of 350 barrels, averaging 179,300 barrels daily, which was 10,400 barrels a day less than the Bureau of Mines estimate and 825 less than the state allowable.

Storage in California increased in September

Los Angeles.—During September, total stocks of crude oil and other products in California were increased 1,597,539 barrels.

Storage of heavy crude and fuel oil was increased 1,303,171 barrels, while stocks of refinable or light crude decreased 380,248 barrels. Gasoline storage was up 630,688 barrels. Gas oil and Diesel oil are more plentiful, and stocks increased 356,822 barrels. With daily production of crude oil closely approaching a daily average of 700,000 barrels, it is expected stocks will show another gain for October.

United States Crude Oil Production

Estimates Compiled by The OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in Nov.)	State Allowable in November	BARRELS DAILY FOR WEEK ENDED	
			November 27	November 20
TEXAS—				
Texas Panhandle	.....	.....	72,100	73,200
North Texas	.....	.....	72,700	73,800
West Central Texas	.....	.....	33,800	34,700
West Texas	.....	.....	188,600	198,600
East Central Texas	.....	.....	96,800	109,700
East Texas Field	.....	.....	431,500	484,600
South Texas	.....	.....	235,000	249,800
Texas Gulf Coast	.....	.....	186,700	197,600
Total Texas	1,413,300	1,351,677	1,317,200	1,422,000
CALIFORNIA—				
Long Beach	.....	.....	58,500	58,000
Santa Fe Springs	.....	.....	42,000	41,500
Huntington Beach	.....	.....	37,500	39,000
Dominguez	.....	.....	30,000	29,000
Inglewood	.....	.....	17,000	16,000
Ventura Avenue	.....	.....	36,500	38,000
Seal Beach	.....	.....	9,500	9,000
Midway-Sunset	.....	.....	73,000	74,000
Elwood	.....	.....	8,000	8,000
Kettleman Hills	.....	.....	80,000	83,500
Mountain View	.....	.....	15,500	16,500
Playa del Rey	.....	.....	8,000	8,000
Wilmington	.....	.....	60,500	69,500
Others	.....	.....	229,000	233,000
Total California	674,600	*674,600	705,000	714,000
OKLAHOMA—				
Oklahoma City	.....	.....	125,575	148,900
Seminole Area	.....	.....	107,950	111,475
Crescent	.....	.....	9,825	7,550
Lucien	.....	.....	13,650	13,650
Fitts	.....	.....	80,250	80,850
Edmond	.....	.....	11,800	11,500
Moore	.....	.....	9,800	9,400
Others	.....	.....	208,975	206,700
Total Oklahoma	598,000	575,000	567,825	590,025
LOUISIANA—				
North Louisiana	.....	.....	74,925	75,075
South Louisiana	.....	.....	169,200	170,100
Total Louisiana	246,200	253,150	244,125	245,175
KANSAS—				
Ritz-Canton	.....	.....	5,025	5,100
Chase	.....	.....	6,750	6,700
Hollow-Nikkel	.....	.....	2,550	2,600
Sedgwick	.....	.....	3,825	3,925
Burrton-Haven	.....	.....	10,100	10,225
Lorraine	.....	.....	3,175	3,000
Russell County	.....	.....	30,900	34,600
Silica-Isern	.....	.....	14,050	12,500
Others	.....	.....	102,925	100,275
Total Kansas	189,700	180,215	179,300	178,950
NEW MEXICO	104,800	104,800	104,800	104,700
MICHIGAN	47,400	.....	55,100	56,100
ARKANSAS	33,100	.....	45,025	46,075
MOUNTAIN STATES—				
Wyoming	56,300	.....	57,200	54,300
Montana	17,100	.....	15,100	15,200
Colorado	4,500	.....	4,200	4,200
Total Rocky Mountain States	77,900	.....	76,500	73,700
EASTERN STATES—				
Pennsylvania Grade	.....	.....	78,400	77,600
Southern Illinois (New Pools)	.....	.....	18,500	18,500
Illinois-Indiana (Old Pools)	.....	.....	16,300	16,200
Others, Eastern	.....	.....	22,400	22,300
Total Eastern States	124,000	.....	135,600	134,600
Total United States	3,509,000	.....	3,430,475	3,565,325

* Recommendation of Central Committee of California Oil Producers.

WORLD DEVELOPMENT and TECHNOLOGY

Edited by
WM. V. GROSS, Associate Editor

Roumania's Progress in Drilling and Production

By EMIL FISCHER, Petroleum Engineer, Bucharest

ONE may say that the Roumanian oil industry has reached a level of modernization comparable to that of the United States, insofar as exploration and exploitation methods are concerned. This is partly attributable to the policy, followed for several years, of sending young engineers to the new continent to study the latest methods and equipment.

Current Practices

Drilling operations in Roumania are more or less standardized. A brief resume of current practices would include:

(a) Drilling to between 100 and 200 meters and then setting 16 or 20-inch surface casing in accordance with government requirements for isolation of phreatic water. In regions where shallow pressures are heavy, a blowout preventer is used even on the surface string.

(b) Open hole is usually drilled from the bottom of the surface string to the pay sand, rotary, of course, being employed in most instances. Walls of the hole are protected by properly mixed mud, weighted with commercial materials when such procedure is advisable.

(c) It is likewise customary to run an electrical logging device to determine location of water, gas and oil strata, the practice being continuous in cases of exploratory wells.

(d) After the electrical log data is determined, a single string of casing is set to a point below the bottom of the producing horizon.

(e) Cement is then pumped on the outside of this production string up to the surface. Diameter of the string will run between seven and eight inches.

(f) Then starting at the bottom of the string and working up, perforations are effected, electrically or mechanically, opposite strata chosen from interpretation of the electric log. A variation from this standard method which has been used but rarely in late years is to land and cement the single string above the oil sand before penetrating the sand with the bit. The oil sand is then tapped through a separate perforated liner.

Fast Drilling Time

In proven fields, using the above sketchily described procedure, wells of 2000 meters (6580 feet) depth are often spudded, drilled and put on production in 60 days. Roumania, also, has accumulated its share of speed records. For instance, Concordia Oil Company drilled 800 meters (2632 feet) in seven days in a well in Gura Ocnitei field, and another well was drilled by Steau Romana to 1760 meters in 34 days. These accomplishments were, of course, in proven fields. Nevertheless, Creditul Minier's first wildcat at Chitorani drilled 3382 meters in 193 days.

Progress has also been made in Roumania in the time used for effective drilling. In 1935 time consumed in effective drilling averaged 40 to 45 percent of the total time to get the well down to the oil horizon, the remainder being consumed in fishing jobs and other delaying operations. In 1936 and for the first nine months of 1937, effective drilling time was nearer 70 percent, perhaps a little over.

Casing Procedure Simplified

A recital of the progress in economy in drilling would not be complete without mention of the money saved nowadays in casing wells through employment of the two-string policy. The consumption of steel per meter of well drilled and cased has been reduced to 36-40 kilograms for a 2000 meter well medium depth well. Ten years ago the steel consumption was 400 kilograms per meter. In 1929, when Roumanians initiated the practice of reducing the number of strings of casing, the weight of steel consumed was 135 kilograms per meter.

Mud Problems Not Acute

Mud problems have not been as acute in Roumania as have those of the United States. The respective positions of strata are more uniform than those of the United States. Then, too, they are just about devoid of heavy shales, which have been found so far only at Chitorani. However, as previously inferred, mud mixtures have in a majority of instances answered local problems.

Heavy drill collars, mounted directly over the bit, have been used in this country since 1931 to increase the weight on the bit and to make hole against great pressures. These collars, ranging in length up to 98.7 feet, are considered one of the principal factors, locally, in maintaining straight holes. Use of full-hole tool joints has become common practice in connection with efforts to obtain continuous circulation and to reduce the exhaust pressure of mud pumps.

Strides have been taken in increasing the effective footage of a given type of bit. This has been brought about by hard surfacing the bits. While the fishtail is the bit ordinarily used, for very hard formations Roumanian operators have recognized the economic advantage of specially manufactured hard formation bits. The aforementioned well of Creditul Minier at Chitorani used 38 fishtails and 10 core bits in drilling to slightly below 11,126 feet.

Prefer American Equipment

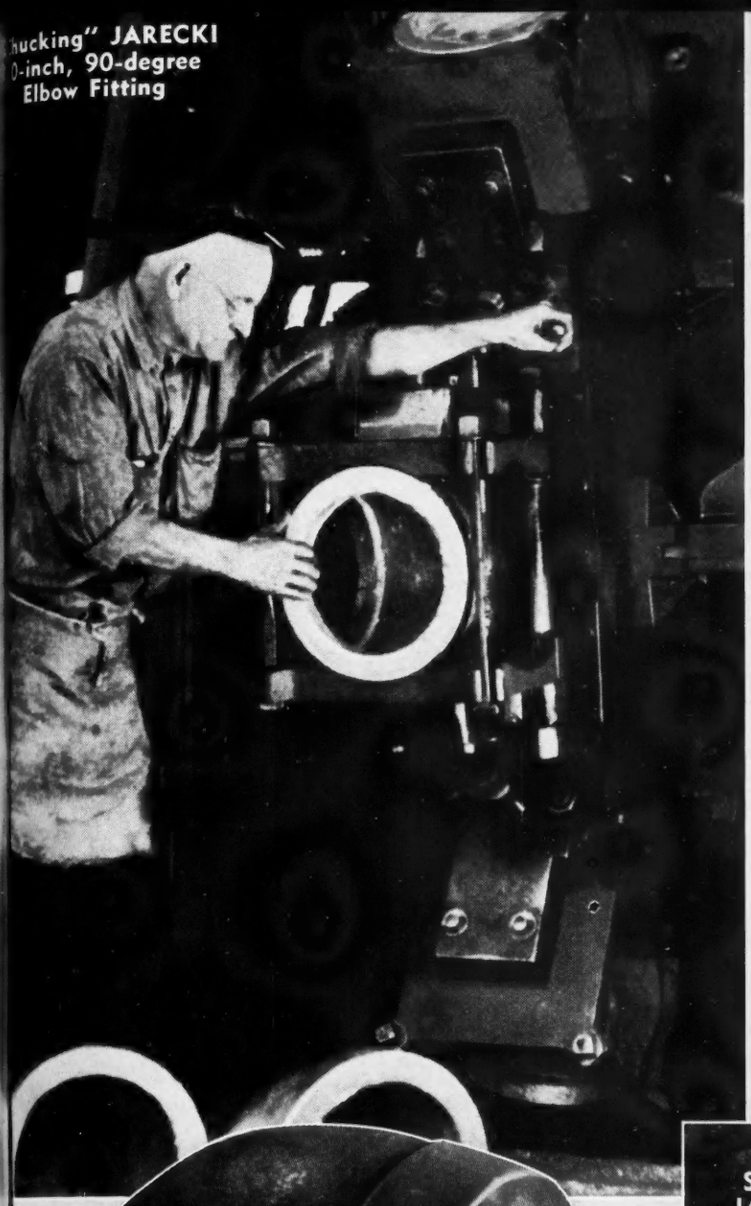
In the matter of rotary rigs, there is a pronounced preference for those of American design, statistics developed

HUNGARY'S GUSHER

A cable from Paris, France to The OIL WEEKLY November 25 stated word received from Budapest, Hungary, Thanksgiving Eve was that European Gas & Electric Company's Budafaputza 2, near Lispe, Hungary, had been completed for 500 barrels initial production from 4300 feet. The cable went on to say that after the well had cleaned itself it increased to 1600 barrels per day, or two thirds of the domestic consumption of petroleum products in the Hungarian nation.

In response to request for confirmatory information, The OIL WEEKLY received additional information by wire November 26 to the effect that the well was good for 500 barrels of 42 gravity oil, but that the depth was 3962 feet. Budafaputza 2 is shut in due to lack of tankage.

The first well drilled on Lispe structure produced about 10 barrels of oil with some gas. It is impossible to make a statement at this time of future prospects of the strike due to the meagerness of information.



"hucking" JARECKI
0-inch, 90-degree
Elbow Fitting

PERFECT ALIGNMENT

assured by Simultaneous Threading

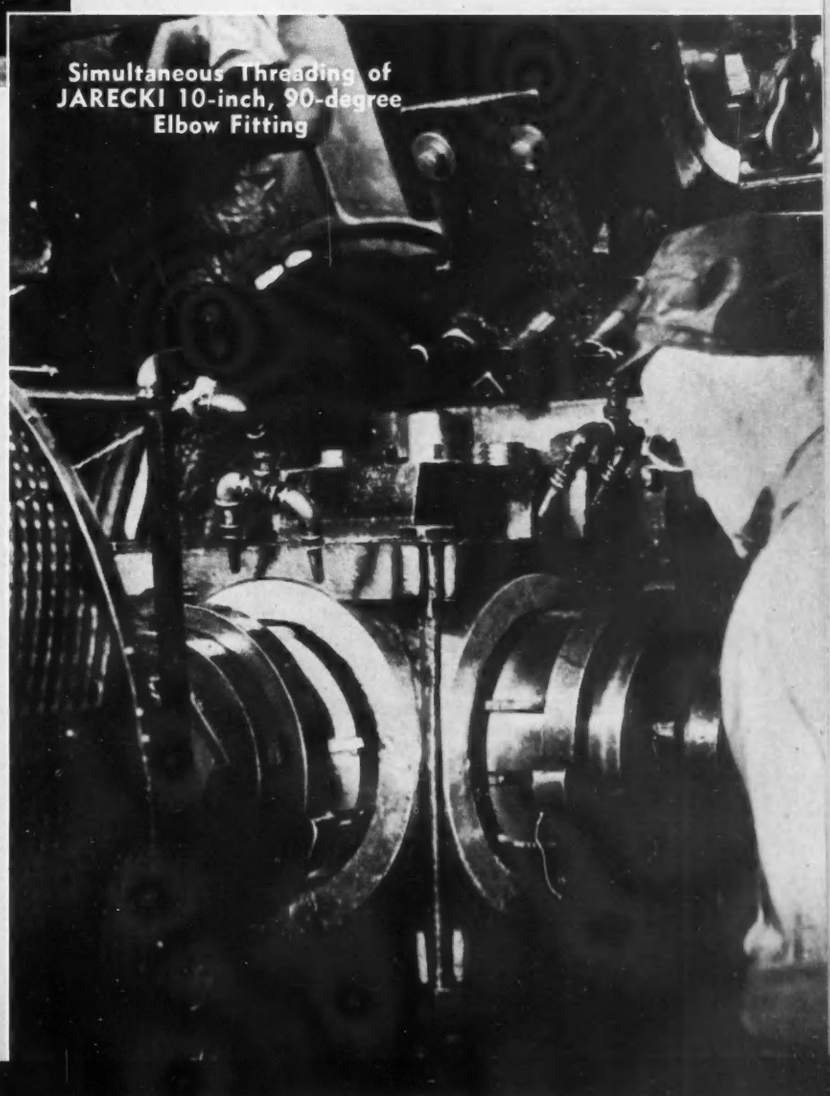
We show here an interesting step in the manufacture of a JARECKI 10-inch malleable iron 90-degree Elbow.

The top photograph shows workman "chucking" the fitting in a special tapping machine which was designed and built by JARECKI especially for large size fittings. The bottom photograph shows the actual tapping operation. The taps are set in heavy bearings at exactly 90-degree angle, and both openings in the fitting are tapped at the same time. As a result of this simultaneous threading, pipes will screw into the fitting at an exact 90-degree angle and will be in perfect alignment.

In its modern factory at Erie, Pennsylvania, JARECKI manufactures all types of malleable, gray iron and bronze pipe fittings; a complete line of iron body and bronze valves; pipe-threading equipment; and a line of oil well specialties. For information about JARECKI "Time-Tested" products, write for General Catalog No. 34, or visit our nearest oil country store.

See JARECKI Section, 1937 Composite Catalog

JARECKI Heavy Malleable Elbow



Simultaneous Threading of
JARECKI 10-inch, 90-degree
Elbow Fitting

Jarecki

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this year by Monitorul Petrolului Roman showing that 90 percent of the 130 rotary rigs in Roumanian fields are of the American type.

Drilling against pressure over here calls for the usual technique involved in America, involving, naturally, advantageous use of blowout preventers, largely of the automatic, or pressure actuated, type.

Equipment, casing and tools used in drilling follow pretty closely A.P.I. standard types. In the matter of casing, the Roumanian trend definitely has been toward use of lighter pipe and away from heavier pipe. Resistance to pressure is obtained through use of cement applied around the outside of the casing. The trend toward lighter casing in Roumania started in 1935, with the result that most of the material purchased today is Grade D, A.P.I. specifications.

Automatic Controls

Automatic control equipment also has proven popular in Roumania as it has been found helpful registering the suspended weight of the drilling set, the pressure on the bit, speed of the rotary table, torque on the drill stem, and the exhaust pressure of the mud pump. Fluid friction types of draw works brakes are in use also.

Steam is the common prime mover in Roumanian rotary drilling, but electrically driven rigs have been gradually increasing since 1932. These now total 24. Last year they were credited with having drilled 80,600 meters, or 22 percent, of Roumania's total footage.

Mud pumps used in Roumania, with a few exceptions, are of the horizontal, two cylinder type, rated at 13 atmospheres pressure (191.1 pounds), but capable of building up 140 atmospheres (2058 pounds) with an exhaust capacity of 1500 liters per minute. A pair of such pumps are worked either in series or hooked up in parallel through simple maneuvering of cocks. Recent importations by oil companies have included vertical type steam engines and vertical pumps.

Drilling Costs Down

Possibly one of the most impressive ways of describing Roumania's progress in drilling technique would be presentation of drilling cost figures for a few years. In 1926 the cost per linear meter drilled was 17,800 lei, or about $123.60 U. S. currency; in 1931 it was 7000 lei, or $48.50; in 1933 it was 4600 lei, or $32; whereas in 1936 the average cost per meter drilled was only $16, or 2300 lei. (One meter is 3.29 feet.)

Wells in Roumania are largely completed by the "circulation method." That is, the pump forces into the well a mixture of oil and gas, which is used to replace the drilling mud. In this way we obtain a pressure differential, so that when the pressure on the liquid in the well becomes less than the bottom hole pressure the well begins to flow. This method is, I believe, referred to in the United States as "washing in with oil."

Producing Methods

Methods used for producing wells in Roumania are the usual ones: natural flow checked and controlled, use of various methods of gas-lifting when the natural flow stops, and mechanical pumping as the last phase of exploitation. Our engineers who have visited America have applied locally the improvements observed in the new country. These improvements regard surface equipment, as well as methods for study of reservoir conditions. Proper consideration of gas-oil ratio figures much more prominently in Roumania today than it did in the past.

Centralization and simplification have been keynotes of the recent trend in production practice here, bringing into play the use of simple well-head hookups, grouped batteries of oil and gas separators, and central extraction plant equipment. Other improvements consist of preventive elimination of paraffin, use of insert type pumps, treatment of emulsions by chemicals, the decantation and gathering of gas from tanks through use of hermetic deckings, and employment of light, portable derricks for going back into the hole and perforating upper horizons, reworking, cleaning out, et cetera.

Lifting Costs Less

As a result of the above, lifting costs have been reduced. Considering a 10-ton capacity tank car as a unit of measure, the cost has been reduced as follows: production cost per unit in 1926 was 8000 lei, or $55.50; cost per unit in 1931 was 2000 lei, or $13.80; cost per unit in 1933 was 1300 lei, or $9.25, and production cost per unit in 1936 was down to 1080 lei, or $7.50.

Studies of reservoir conditions involving pressures, passage of gas through oil, and similar subjects are relatively new in Roumania. Charts showing the variations of bottom-hole pressures and liberation of gas through oil emulsion were used for the first time in this country in Bucsani field in 1935. These studies have aided in acceptance of the theory of the value of unit operation. And the new mining law of 1937 expressly recommends and makes possible unit operation in certain areas.

Production History

Roumania's production history dates back to 1857, when Colibasi field in the district of Dambovita produced 55 tons and Bustenari field in the district of Prahova produced 220 tons. Today Roumania has 27 productive oil fields yielding 3.53 percent of the world's total or 8,704,000 tons annually. Cumulative production of Roumania to January 1, 1937, is estimated at 99,800,000 tons.

Fields of the Moreni district have produced more of Roumania's oil than those of any other district, having since 1904 accumulated a total of 28,504,100 tons. Second position belongs to fields of the Gura-Ocnitei district, which have produced 20,333,400 tons since discovery of oil there in 1899. Other Roumanian fields, in the order of their respective importance in the cumulative production totals are: Bustenari-Runcu-Chiciura, 13,431,400 tons; Boldesti, 7,298,300 tons; Ochiuri, 6,225,300 tons; Baicoi-Tintea, 4,487,800 tons; Campina, 4,431,-700 tons; Ceptura, 3,790,600 tons; Bucsani, 2,286,500 tons; Arbanasi, 2,059,900 tons; Moinesti-Bacau, 1,667,800 tons; Razvadu, 1,197,100 tons; Aricesti, 898,-200 tons; Viforata, 705,600 tons; Colibasi, 432,200 tons, and other fields, 1,505,700 tons.

Leading Fields

In the order named, the four leading producers of Roumanian fields today are Bucsani, Gura-Ocnitei, Boldesti, and Moreni-Piscuri.

Bucsani, located in the district of Dambovita about seven kilometers south of Gura-Ocnitei, was discovered by Steaua Romana in October, 1934, and is still in the throes of an intensive development campaign.

Gura-Ocnitei's production is settled, most of the oil coming from old wells. Current drilling activity there is at a very low ebb.

Boldesti, which occupies third rank among producing districts, is a modern field and economically operated, although production is obtained at relatively great depths, producing horizons being found at from 2000 to 2400 meters (6580 to 7896 feet). Steaua Romana, Astra Romana and Romana-Americana, all major companies, are the main operators. Boldesti was discovered in 1928, but exploitation in earnest did not get under way until 1931.

Present activity in Moreni-Piscuri is directed at extension drilling, largely in the region of the Piscuri section. Most of the production, however, comes from the older wells.

Margineni Still Wildcat

Margineni field, still considered wildcat territory and not yet out of the exploratory stage, may take a more prominent place in the production column of Roumania in 1938. It is six kilometers south of Moreni.

Roumania's oil industry is comprised of 114 Roumanian limited corporations with paid up capital aggregating 10,-802,988,000 lei. Of these 12 are classified as being in the production and refining branches of the industry, 47 are producers only, 10 are refining companies, 19 are sales corporations, 6 are royalty companies, 4 gas and gasoline producing companies, for transportation companies. Twelve of the total are unclassified. Considerably more than half of Roumania's oil industry's paid up capital is represented by the first two classifications. There are six foreign companies operating in Roumania representing a total capital of 1,910,914 pounds sterling and 20,200,000 French francs.

Plan negotiations of trade agreement with England

Washington, D.C.—Plans for negotiation of a reciprocal trade agreement with the United Kingdom, considered the most important of all the treaties so far undertaken by the administration, were announced by Secretary of State Cordell Hull.

An invitation to suggest commodities on which concessions might either be granted or requested was extended by the secretary to all interested, to be filed with the committee for reciprocity information by December 16. At a later time, dates will be announced for public hearings by the committee and a list issued of the commodities which will there be considered as the basis for concessions.

The United Kingdom is the largest foreign market of the United States, and petroleum, crude and refined, constitutes one of the most important items of that trade, it was disclosed by the state department.

Exports to the United Kingdom in 1936 had a value of $440,122,000, as

compared with $848,000,000 in 1929; shipments of crude petroleum and refined products were valued at $28,342,000 against $100,805,000.

The most important items of our oil trade with the United Kingdom, it was said, are gasoline and other motor fuels, shipments of which last year, including naphtha, etc., were 3,593,000 barrels valued at $7,889,000, compared with shipments in 1929, excluding naphtha, etc., of 17,518,000 barrels valued at $67,393; illuminating oil, 937,000 barrels valued at $1,663,000 against 2,794,000 barrels valued at $8,734,000; gas oil and fuel oil, 1,360,000 barrels valued at $1,741,000 against 3,593,000 barrels valued at $4,735,000; lubricating oil, including insulating and light lubricating oils, 2,058,000 barrels valued at $11,932,000 against (excluding insulating and light lubricating oils) 1,804,000 barrels valued at $14,957,000; and paraffin wax, 55,604,000 pounds valued at $1,557,000, against 78,139,000 pounds valued at $3,025,000.

Mexican states have right to tax sales of gasoline

It is constitutional for states governments to levy a sales tax on gasoline, the national supreme court of Mexico held in throwing out an appeal by the Mexican Eagle Oil Company from the demand by the Yucatan state government that it pay a three percent of sales price tax on gas it sells in that state. The court disagreed with the Eagle's argument that this state tax violates the constitution which stipulates that oil matters are under federal jurisdiction, holding that the states have the right to enact imposts on sales. With regard to gasoline, the court ruled, states cannot impose a sales tax of more than four percent of the price.

Russian petroleum exports register sharp decline

Petroleum exports from Russian Black Sea ports passing Istanbul during September declined from 234,008 in September, 1936, to 53,133 tons, according to Julian Gillespie of Istanbul, Turkey.

Approximately 22 percent of the petroleum products exported during September consisted of heavy fuel oils and lubricating oils. The volume and destination of the petroleum products shipped were as follows:

Countries	Fuel Oil	Lube Oil	Kerosene	Gasoline	Total
Germany	12,466	3,614	....	....	16,080
England	....	14,430	....	....	14,430
Japan	....	....	....	8,874	8,874
Siberia	....	9,573	....	....	9,573
Turkey	909	511	1,445	1,311	4,176
Total	13,375	28,128	1,445	10,185	53,133

	September		First Nine Months	
	1936	1937	1936	1937
Lub. Oil	9,004	28,128	269,020	194,518
Fuel Oil	137,054	13,375	967,903	606,026
Kerosene	33,328	1,445	249,538	132,764
Gasoline	53,930	10,185	503,862	323,322
Asphalt	692	....	6,376	....
Paraffin	....	....	608	....
	234,008	53,133	1,997,307	1,256,630

Geologists due in Guatemala

Twelve geologists of Shell Petroleum Company of Guatemala are scheduled to arrive in Guatemala City soon to begin work December 1 on a concession recently granted that company by the government. Aerial mapping has been going on for some time.

Outlook Is Brighter

Turner Valley pipe line outlet will be enlarged; other steps taken to broaden field's crude market.

A SERIES of developments last week gave operators in the Turner Valley field of Alberta the most encouraging outlook since proration was instituted in the new Canadian oil field more than two months ago. They are:

One—Imperial Oil Company, Limited, announced an $850,000 expansion program which will increase capacity of its Calgary and Regina refineries from 9000 to about 14,000 barrels daily.

Two—R. V. LeSueur, Imperial Oil Company vice president, announced that additional loops on its 50-mile pipe line from the field to Calgary, refinery center and shipping point, will be made next spring and increase the capacity of the line to 17,000 or 18,000 barrels daily. Improvements now under way and scheduled for completion by the first of the year will raise the line's carrying capacity from 10,000 to 13,000 or 14,000 barrels daily.

Three—Economy Oils, Limited, announced immediate construction of a $100,000 refinery with 500-barrel daily capacity on the Century Royalties, Limited, lease in South Turner Valley.

Four — British American Oil Company, Limited, which carries on an extensive marketing program in Western Canada in addition to manufacturing operations, announced closing of its refinery at Coutts. The action was in line with the company's policy to use Turner Valley crude exclusively. Once a large purchaser of Montana crude, the last contract for purchase of crude from this source will expire at the end of the year.

Five—Union Oil Company of Canada, Limited, formerly marketing gasoline refined from California crude oil, will substitute gasoline refined from Alberta crude immediately, J. Venus, district manager of the company at Calgary announced.

Produce 35 Percent of Potential

With a daily potential production nearing the 25,000-barrel mark, a series of proration orders have been issued by Imperial and British American companies, principal buyers of Turner Valley crude that now hold production to 35 percent of potential. The first order was issued September 11 and cut production to 65 percent and the second on November 1 which cut production to 45 percent. The last order, setting a 35 percent rate, was made November 15.

Freight Rates Down

Increases in the Imperial company's refinery capacity and recently reduced freight rates on Turner Valley crude shipped to Regina, will enable the company to market gasoline from Alberta crude as far east as Rainy River, Ontario—territory which has been principally served by the company's refinery at Sarnia, Ontario. The Sarnia plant uses United States crude.

Good Completions

Royalite Oil Company completed Sterling-Pacific 6, Legal Subdivision 5, Section 33, Township 18, 2-w5, at 7117 feet, or 442 feet in the Madison limestone. Initial production was 700 barrels daily, with a marked increase expected when acid treatment is given shortly.

West Flank Oil Company's No. 1, Legal Subdivision 1, Section 32, Township 18, 2-w5, stopped drilling at 7135 feet, or 440 feet in the Madison. It was scheduled to complete early this week. The company's No. 2, on the line dividing Legal Subdivisions 1 and 8, same section, was drilling at 5590 feet, and No. 3, on Legal Subdivision 8, was drilling at 6010 feet.

Acid treatment given Brown Oil Corporation's No. 1, Legal Subdivision 14, Section 16, Township 18, 2-w5, showed a settled yield of 1850 barrels, compared to a yield of 350 barrels before acidization. Gas pressure is at 5,000,000 cubic feet. The well has been choked to 647 barrels under 35 percent proration now effective in the Valley. The company's No. 2, given treatment at the same time, did not respond as well. Its new settled production is 670 barrels daily, with gas pressure at 1,500,000 cubic feet. The allowed production is 234 barrels daily.

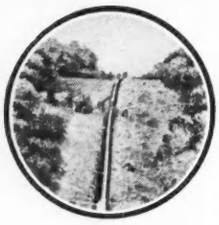
The only well drilling in the Madison producing formation with cable tools, National Petroleum Corporation's No. 1, Legal Subdivision 8, Section 29, Township 18, 2-w5, is more than 250 feet in that formation. It has a gas flow of 2,000,000 cubic feet and, with 6000 feet of fluid in the hole, the well flows oil every time the tools are taken out. Drilling is now between the first and second producing horizons.

19-Mile Spread

Rigs in Turner Valley at points are 19 miles apart. Home Oil Company is drilling the most northerly well on Legal Subdivision 8, Section 33, Township 20, 3-w5, now below 7600 feet, while Davies Petroleums is providing the most southerly test in No. 3 on Legal Subdivision 7, Section 33, Township 18, 2-w5, now rigging up preparatory to spudding with cable tools. The Davies test is 3½ miles south of Brown Oil Corporation's No. 1.

Roxana Petroleum's test on Kootenay Dome, 40 miles west of Calgary and one of the most important Alberta wildcats, is 3725 feet deep, 720 feet in the Devonian limestone. Cable tools are being used.

PIPE LINE NEWS



New Michigan lines

Construction has been started on a 35-mile, 6-inch crude oil pipe line for the Bay City Pipe Line Company connecting the Buckeye field of Gladwin County, Michigan, to a refinery under construction at Bay City, Michigan. Rich Construction Company are the contractors. The pipe line company, as well as the Bay City Refinery Company, was organized by independent Buckeye field producers seeking an outlet for their crude. Work on both the pipe line and the refinery are being carried on as rapidly as arrival of material permits.

Construction of the 13-mile line to link the Sherman field to Mt. Pleasant, Michigan, where it will feed resources of the Gas Corporation of Michigan serving Mt. Pleasant and two other central Michigan communities suffered a delay last week because of failure to receive a shipment of 4-inch pipe. Four miles of the line have been laid. The H. L. Gentry Engineering Company, Jackson, has the contract.

Gas booster station

The Mississippi River Fuel Corporation has started construction of a gas booster station on its line to St. Louis seven miles south of Newport, Arkansas. The J. F. Pickett Engineering Company, Kansas City, has been awarded the contract and H. O. Ziebold, engineer for the Mississippi River company, will remain in Newport while the work is underway. The line was built in 1930.

Barker and Woods may build line from Lisbon to river

Barker and Woods of Houston, Texas, are offering three-year contracts to producers in the Lisbon field of Louisiana at the present posted price and have approximately 25 wells reportedly contracted for. If sufficient connections are secured on the three-year basis they plan to build a six-inch line from Lisbon to a point on the Ouachita River near Monroe and transport the oil from that point to tidewater on barges. They are reported to have a market for 5,000 barrels daily.

Hercules Gasoline Company is reported seeking casinghead contracts with a view of erecting a casinghead plant at Lisbon. This company has such a unit in the East Texas field.

Pipe Line Facilities Retard Permian Basin Expansion

By H. H. KING, Staff Writer

PIPE line facilities available for the mixed grades of crude produced in West Texas and southeastern New Mexico have not been expanded proportionately with proration allowables. The Permian basin, overlapping a portion of the two states, is confronted with the possibility of its aggressive drilling program being curbed in the near future because of its pipe line outlet reaching the saturation point. Six trunk line systems serve the Permian basin, and five of these share outlets with the two states. The district also has two major outlets that are classed as stub lines. The combined capacity is 390,000 barrels daily, and currently the district is producing 300,000 barrels daily. Local refineries are absorbing 21,000 barrels of crude daily.

The Permian basin has been one of the most active drilling centers in the United States throughout the summer. It has likewise held the lead in piling up proved acreage for future drilling through new discoveries and major extensions to established fields and pools. Lease requirements and competitive drilling will force activity in the new areas. Within recent months exploratory tests have established oil producing areas of major proportions in Gaines, Yoakum, Cochran and Hockley counties, all isolated from pipe line facilities. The former two counties are assured of an immediate market outlet through the extension of Humble Pipe Line Company's system from the Hobbs field, New Mexico. The company is invading the new areas with a 6-inch carrier, which can not be operated at capacity until its two trunk line outlets from older sections of the district are enlarged.

Humble Pipe Line Company is the largest buyer and transporter of oil produced in the bi-state district, having a maximum capacity of 112,000 barrels daily out of its Kemper terminal, near Big Lake field, Reagan County. The company has been operating close to capacity for months. Two 8-inch lines extend east from Kemper, via Ranger district to Webster, near the Texas coast. This unit has a capacity of 47,000 barrels daily. The company operates a combination 10- and 12-inch carrier southeast to Ingleside, near Corpus Christi, with a capacity of 65,000 barrels daily to Lytle station, near San Antonio, where the capacity is stepped up to 90,000 barrels to accommodate Yates field oil deliveries made by Illinois Pipe Line Company's stub line.

Shell Pipe Line Corporation is likewise a big market factor in the bi-state district, having two 10-inch outlets from McCamey terminal. Each is rated at 40,000 barrels daily capacity. One unit extends direct to Shell Petroleum Corporation refinery and tanker terminal at Houston, while the other is routed via Healdton, Oklahoma, to the latter's refineries in the Middlewest.

Texas-New Mexico Pipe Line Company, successor to The Texas Pipe Line Company, is providing some relief to the transportation situation by restoring main line stations along its 12-inch carrier. Completion of this work last week increased the capacity of the line from 42,000 to 60,000 barrels daily. In anticipation of the added capacity the owners of this system are diverting excess crude runs to field storage. The line is owned jointly by The Texas Corporation, Consolidated Oil Corporation, Cities Service Oil Company and Tide Water Associated Oil Company. Controlled production held by each in the district is being connected as pipe line and storage capacity becomes available, and each purchases outside oil independently.

Invasion of the north portion of the Permian basin of West Texas is to be made by the Texas-New Mexico Pipe Line Company, possibly late this year through the construction of an extension line from Monument field, New Mexico, via Hobbs field, thence to the Slaughter field, Hockley County. Connections will be given West Texas fields along the route.

Gulf Refining Company, pipe line division, has been operating near maximum capacity, and recently stepped up its facilities to the west of Midland terminal by installing two additional electric motor-driven centrifugal pumping units. This company has a rated capacity of 50,000 barrels from Midland via Ranger district to the Coast. Gulf Oil Corporation, producing affiliate, is the largest oil producer in West Texas and also New Mexico.

Capacity of Atlantic Pipe Line Company's 10-inch carrier, which extends to Atreco, near Beaumont, was reduced from 40,000 barrels to 26,000 barrels daily through the removal of idle booster station units when the company invaded the East Texas field. These units have not been restored. Similar situation prevails with Magnolia Pipe Line Company's 8-inch outlet, which is now rated at 22,000 barrels daily. Idle station equipment and 8-inch loops were pulled for service in East Texas and Rodessa. The latter line is currently operating at less than 50 percent capacity, and is isolated from fields undergoing development.

Eight-inch carrier operated from Wink station to El Paso by Pasotex Pipe Line Company has attained capacity load in recent months, with considerable outside traffic. It is rated at 15,000 barrels daily, and was built primarily to serve Standard Oil Company of Texas' refinery at the border city. Common carrier shipments of crude are also handled for the nearby plants of The Texas Company and McNutt Oil & Refining Company.

Gas rate hearings in Pennsylvania

Hearings were conducted by the Pennsylvania public utility commission against 25 natural gas companies operating in western and northern counties last week in the state's drive to bring down rates charged by 104 companies. The commission announced, at the start of its investigation several weeks ago, that its inquiry is to determine whether rates are just and that temporary rates to give customers an immediate reduction may be established during the course of the investigation and before all testimony is in.

Companies heard last week are the Columbia Natural Gas Company, Carnegie Natural Gas Company, Opollo Gas Company, Anderson Natural Gas Company, Mercer Gas, Light & Fuel Company, Bellewood & Monongahela Natural Gas Company, Hanratty Domestic Fuel Supply Company, Mt. Morris Gas Company, Waynesburg Home Gas Company, Revere Natural Gas Company, New Freeport Natural Gas Company, Lawsonham Oil & Gas Company, Mercer County Gas Company, Bessemer Natural Gas Company, Slippery Rock Heat & Light Company, United Natural Gas Company, St. Marys Natural Gas Company, Ridgeway Natural Gas Company, Crosby Gas Company, Smethport Natural Gas Company, Kane Gas Light & Heating Company, Allegheny Gas Company, Hazelhurst Gas Company, Ludlow Gas & Electric Company and McDade Gas Company.

Samfordyce lease deal

Corpus Christi.—Frank Ware, Dallas operator, purchased 27 producing wells and 179.51 acres in the Samfordyce field of Starr and Hidalgo counties for a consideration of $315,000. The consideration was reported in San Antonio November 26 to be cash as against obligations on the various leases.

The deal involved nine different tracts in the Samfordyce field, 8 of which have one to nine producers each and the ninth is an undeveloped 5-acre tract. The leases ranged in size from 5 to 40 acres each, and spread from the southeast part of the field to the north edge of deeper production in the north section of the field.

Involved in the deal were G. W. Wheeler of Mission, wo drilled the discovery well of the Wheeler sand; D. K. Harrison and Don Danvers, both of San Antonio, Lee Davis of McAllen, and Val-Tex Oil Corporation of McAllen.

North Dakota test

Tioga, N. D.—The wildcat test of Standard Oil Company of California on the Nels Kamp farm, in Nesson flats area south of here, is drilling below 3000 feet. The wildcat is the first deep test to be undertaken in the history of the state.

Appalachian gas reserves are low

E. E. Roth, geologist for the Central Kentucky Natural Gas Company, estimated that 16,000,000,000,000 cubic feet of gas has been taken from the Appalachian fields and that only 6,000,000,000,000 cubic feet remained, in a hearing before the Kentucky public service commission last week. Roth predicted that the company's reserves would be exhausted in 25 years.

J. A. Krug, chief consultant for the commission, explained the state body's investigation was primarily on wholesale rates charged at Midway, Frankfort and Versailles. Hearings on the case are to be continued in December.

May extend Judkins

San Angelo, Texas.—Oil Well Drilling Company's W. E. Connell 1, NE NE SW PSL Section 28, Block B-16, located 1¾ miles west of production in the south portion of the Judkins field, logged oil showings in sandy-lime at 3385-95 feet, and halted at 3442 feet to move in cable tools.

Gulf Oil Corporation's University 1-G, NEc NW Section 8, Block 14, Andrews County, semi-wildcat two miles north of production in the Deep-rock-Ogden pool, showed free oil and small amount of gas in lime at 4290-95 feet. Drilling was under way with cable tools at 4305 feet. It has an elevation of 3208 feet.

Avoca extended mile

Abilene, Texas.—Expansion of the Canyon horizon in the Avoca field, northeastern Jones County, 1 1/3 miles to the southwest became assured when Owen M. Murray and L. C. Harrison's R. N. Rial 1, NE NW NW Section 198, BBB&C Ry. Survey, started filling with oil from sandy-lime at 3327-28 feet. Casing has been cemented for a production test.

Completion of this outpost will give the field a length of 2¼ miles along a northeast to southwest trend, with an anticipated width of more than one mile.

Development of oil production from the Canyon zone in the Ivy pool, northwestern Shackelford County, appeared promising when Owens-Snebold Oil Corporation's Haterins 1, NEc Section 163, BBB&C Ry. Survey, recovered oil-saturated sandy-lime at 3193-95 feet.

Oil in the Courts

[*Continued from page 12*]

and six affiliates at Columbus, it was indicated last week. The companies, and 14 of their officers, are defendants in a $42,000,000 damage suit brought by John L. Davies, city attorney of Columbus who is acting as an individual gas consumer, alleging fraudulent dilution of natural gas sold to approximately 700,000 Ohio customers.

Members of the Ohio public utilities commission said that filing of the suit places prior jurisdiction in the hands of the Franklin County courts and deprives them of any authority to order the company to discontinue mixing non-burnable gases with natural gas sold to customers, if this is done as charged. The attorney general's office, which had advocated a "cease and desist" order, has also swung around to agreement with the commission.

Oil at Conventions

[*Continued from page 14*]

Langley, Oil & Gas Journal, Tulsa; Grant McGee, The News, Oklahoma City; Brad Mills, The Oil Weekly, Houston; J. C. Phillips, Borger Daily Herald; R. H. Richards, Wichita Beacon; K. F. Sauer, The Eagle, Wichita, Kansas; K. C. Sclater, The Petroleum Engineer, Dallas; L. E. Smith, National Petroleum News, Tulsa; and H. M. Cosgrove, Purchasing Agents' Association of Tulsa.

East Texas A.P.I. Chapter program

The East Texas Chapter of the American Petroleum Institute, Division of Production, will meet at the high school auditorium in Kilgore, Texas, at 8 p.m. Tuesday, December 14. An interesting program, to which all interested are invited, has been arranged. The program will include a discussion of the following:

"Pressure-Production Relationship in the East Texas Field," by J. S. Hudnall, of Hudnall & Pirtle, Tyler, Texas.

"Current News of the Oil Industry," by Warren L. Baker, editor, THE OIL WEEKLY, Houston.

"The Application of Liquefied Gases to Development and Production Problems," by Albert E. Sweeney, Petroleum Engineering Department of the University of Texas.

"The Wrong Way to Handle Sucker Rods in the Field," a talking movie by S. M. Jones Company.

A.P.I. Gulf Coast meeting November 29

The Gulf Coast Chapter of the American Petroleum Institute's Division of Production will meet tonight, Monday, November 28. The meeting will be at 7:30 p. m. in the Chamber of Commerce auditorium, and all oil men are invited.

Officers of the chapter for the ensuing year are to be elected at this meeting.

The principal speaker of the evening is to be C. H. Shapiro, metallurgist of Reed Roller Bit Company, who is to discuss "Effect of Heat Treating on Steel." This is an illustrative lecture.

"Current Oil News" is to be the subject of Warren L. Baker, editor of The OIL WEEKLY.

Tulsa A.P.I. chapter meets December 1

First meeting of the Northeast Oklahoma Chapter, A.P.I., will be held in Tulsa, December 1, opening the 1937-38 season of activity. Speaker will be L. R. Hodell, Carter Oil Company, who will speak on "Circumferential Field Welding of Casing." Hodell also will show a motion picture presenting actual welding of the casing as it is run into the well.

1938 National Safety meet is scheduled for Chicago

The 1938 National Safety Congress will be held in Chicago October 10-14, at the Stevens Hotel, the executive committee of the National Safety Council decided recently.

OKLAHOMA FIELDS

Hughes County wildcat prepares to drill to Wilcox.

* * *

Wildcat northwest of Laffoon has oil in hole.

* * *

Deep test in old Fox pool prepares to wash in.

Tulsa.—Drilling operations showed a decided pick up last week, despite unseasonable weather which threatened for a time to cause a shut down in various active areas. In Hughes County, the state's ranking wildcat prepared to drill ahead to the Wilcox sand; the West Fitts field had an extension; southern Oklahoma saw possibility of another producer for the Graham area of Tillman County; the critical moment was near at two deep tests in the old Fox pool, and the Cement pool of Caddo County appeared to have an extension well, although definite tests could not be completed immediately.

Phillips Petroleum Company's Becker 1, NE NW SW 8-5n-10e, southwest of Calvin in Hughes County, on which Oklahoma oil men are pinning their hopes as the opener of the next major pool for the state, was preparing to drill ahead from 4465 feet to the Wilcox sand. Estimates place top of the Wilcox sand at approximately 5775 feet at Becker 1. Nearest dry hole is Phillips' Eberle 1, in Section 12-5n-9e, which had top of the first Wilcox sand at 5648 feet and drilled to 5744 feet where it was abandoned.

May Prove Failure

Production from Wilcox sand has been limited to northern and western Hughes County, where it directly underlies Viola lime and overlies the Tyner horizon. Many observers contend the test may prove a failure because of the variable thickness of the formation, this thickening occurring in the northeast-southwest line across the western portion of the county. So far, Cromwell sand has been the principal producing horizon for the county.

A half-mile east extension for the West Fitts field of Pontotoc County was noted last week at Patsy Oil Company et al's Meharg 1, CWL SE SW 21-2n-6e. The test had top of the Cromwell sand at 3390 feet and drilled to 3502 feet. Tubing was run to 3479 feet and the well flowed 150 barrels of oil in one head flow. It has been shut in for several days.

Another producer seemed indicated at Mid-Continent Petroleum Corporation's Vinson 1, SW SE SE 4-13n-6e, northwest of the Laffoon pool in Lincoln County, which filled 850 feet with oil in 17 hours and was cleaning out at 4229 feet. Vinson 1 had top of the second Wilcox sand at 4207 feet and drilled to 4234 feet. It was shot with 40 quarts between 4214 and 4234 feet before the fill-up occurred.

Show Near Tupelo Rumored

Possibility that the Wapanucka lime was being uncovered at Phillips Petroleum Company's Beck 1, SE SW SW 6-1n-9e, southeast of Tupelo in Coal County, was rumored as the well drilled below 5383 feet, showing streaks of lime.

Development continued slowly at Carter Oil Company et al's Claytor 1, CWL NE SW 27-2n-9e, in the Centrahoma area of Coal County. The test has done considerable coring during the past week, starting at 6433 feet. Between 6462 and 6467 feet, it recovered 3½ feet of brown dolomite with a show of oil and gas, and at 6492 feet, found the McLish lime. At 6462 feet in the Hunton lime, a drill stem test with combined packer showed a little mud and gas in one hour.

Outlook was not promising at Stanolind Oil & Gas Company, Amerada Petroleum Corporation and Mid-Continent Petroleum Corporation's Salina 1, SE NE NW 4-5n-6e, south of the Konawa pool in Seminole County. Bottomed at around 3040 feet in Hunton lime, in three hours the well pumped only a little water. Subsequent tests revealed more water in the hole.

Northwest of the Gray pool in Seminole County and three miles southwest of the Dora pool, W. B. Osborn's Harris 1, in Section 11-6n-5e, had Boggy sand from 2927 to 2956 feet, and after drilling to 2964 feet, set pipe and was preparing to bail in. In the pool proper, J. F. Smith's Orville 2, SE/4 32-7n-6e, drilled to 2980 feet in the sand and flowed 512 barrels of oil in 12 hours after being shot with 40 quarts.

Oklahoma District Oil Company's Beeler 1, NEc SW 7-7n-14e, Pittsburg County wildcat southeast of Ulan, was drilling below 5990 feet in Simpson dolomite. Samples showed streaks of black, asphaltic oil.

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Ardmore Sector

A new producer looms for the Graham area of Tillman County at Indian Territory Illuminating Oil Company et al's Dickey 1, NE SE NW 1-3s-19w, southwest of Frederick. Dickey 1 had top of the Wichita Albany at 740 feet and topped Canyon lime at 3060 feet, the formation from which the Graham 1, discovery producer of the area is producing at present. A core from 3061 to 3071 feet had a recovery consisting of saturated lime and operators were running seven-inch casing to 3059 feet. The test is reported running about six feet higher than Graham 1.

Southwest of Marlow in Stephens County, Ed Parsons et al's Blake 1, CSW NW 22-2n-8w, 6002 feet deep, will be plugged back to around 5000 feet for a test of a show in sand at 4946 feet. It will probably be shot.

Gulf Oil Corporation was coring below 7692 feet at Smith Estate 1, CNW NW 26-2s-3w, in the old Fox area of Carter County. Top of the Oolitic was found at 7672 feet, and a core from 7682 to 7692 feet had a 7½-foot recovery of lime with a show of oil and gas. Gulf's Johnson 1, CSW NW 27-2s-3w, was preparing to wash in after drilling plugs. The test had top of the Oolitic at 7845 feet, set 7-inch casing at 7845 feet and was at a total depth of 7909 feet.

Cement Outpost Flows

In the Cement pool of Caddo County, Ray Stephens' Funk 1, SWc SE 1-5n-9w, outpost test there, found a sand series between 5081 and 5107 feet and flowed 576 barrels of oil in 12 hours. The well is estimated good for more than 750 barrels of oil daily, but production tests have been delayed because of inadequate pipe line facilities.

Oklahoma City Sector

Considerable attention was being given The Texas Company's Roper 1, CWL SW SE 32-15n-1e, in the extreme southeast corner of Logan County, as it reamed to take a drill stem test. The well had top of the first Wilcox sand at 5415 feet, base at 5439 feet. A core in the first sand had a recovery of broken sand, dolomite and green shale with slight stains of oil. Best shows in cores were between 5449 and 5453 feet, the bottom. Nearest pool to the wildcat well is North Wellston, in Lincoln County.

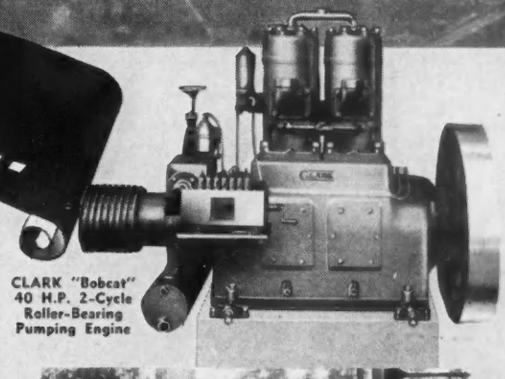
Oklahoma City. — At the regular weekly luncheon meeting of the Oklahoma City Geological Society, held November 22, a review of Stanley Gill's book, "A Report of the Petroleum Industry of the United States," was given by Hubert Bale.

The CLARK "Bobcat"

PIONEER Vertical Pumping Engine

CLARK "Bobcat" Installation
Seminole Field

is enjoying a WORLD-WIDE SUCCESS..



CLARK "Bobcat"
40 H.P. 2-Cycle
Roller-Bearing
Pumping Engine

Now more than 3 years old — having preceded other vertical pumping engines by 2 full years — the CLARK "Bobcat" and "Bobkitten" are long past the experimental stage and are today enjoying a world-wide success earned by outstanding merit.

Designed especially for oil well pumping, these engines offer the advantages of 2-cycle simplicity and of moderate speed, insuring long life. They are built to operate out of doors, saving expense of belt house, the vertical design and short belt saving about 50% in floor space and 55% in foundation costs.

See CLARK Section, 1937 Composite Catalog

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CLARK

CLARK "Bobkitten"
Installation
East Texas Field

CLARK "Bobkitten" 20-30 H.P. 2-Cycle
Roller-Bearing Pumping Engine

Seek salt water seep at Oklahoma City

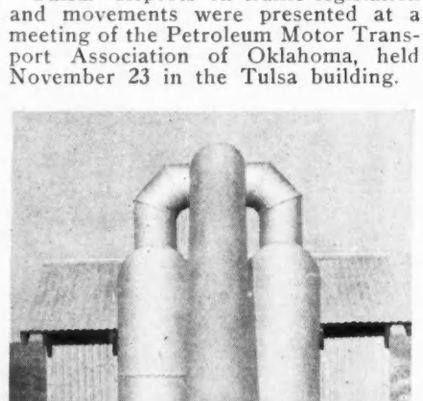
Oklahoma City.—Reopening of the Wirt Franklin Petroleum Company's Miller 1, SWc 35-12n-3w, in the Oklahoma City field, has been authorized by the corporation commission on application of five companies wishing to determine source of salt water seepage in nearby wells. It is thought the salt water was seeping through the plug in the old well into offsets. Expenses of the undertaking will be paid by Indian Territory Illuminating Oil Company, Phillips Petroleum Company, Westgate Oil Company, American Oil & Refining Company and Kerlyn Oil Company, who asked permission to make the investigation.

OKLAHOMA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CADDO COUNTY—		
Magnolia, Riley Jones 2, se ne sw 17-2s-2w	17	2800
CARTER COUNTY—		
Tuesday Oil Co., Presley 1, nw nw nw 5-1s-3w	40	3425
Turman Oil Co., Rexroat 14, ne sw ne sw 10-4s-2w	*	2507
Cox & Hamon, Jackson 1, sw se ne sw 15-4s-2w	2	2477
Rockland Oil, Sarasota 58, nw sw nw ne 23-4s-3w	10	1363
CREEK COUNTY—		
Strozier, McCauley 2, se ne sw 12-16n-11e	180	2358
Shannon et al, Collyer 1, se ne se 33-17n-7e	*	1047
L. B. Jackson, Carman 2, sw sw sw 36-18n-8e	*	1648
Sinclair Prairie, A. D. Whitmore 1, sw sw se 24-18n-9e	*	3035
Johnson Oil Ref. Co., Petrisic 1, ne nw sw sw 12-19n-9e	*	1535
GARVIN COUNTY—		
Cox & Hamon, Matteny 1, nw sw sw 32-1n-3w	176	3363
Julius Liederman, Snow 1, ne sw sw 32-1n-3w (pb 3291)	232	3315
Otto Schultz, Nelms 1, se sw sw 32-1n-3w	127	3446
Carter Oil Co., Potts 1, nw sw se sw 36-1n-3w	*	4155
KAY COUNTY—		
Shaffer et al, Smith 1, nw nw se 8-28n-1w	107	3539
LINCOLN COUNTY—		
Helmerich & Payne, Fitch 1, sw sw ne 15-14n-16e	90	3006
Summitt Drlg. Co., Eakers 2, sw se sw 35-15n-2e	441	5126
NOBLE COUNTY—		
Phillips & Shell, Hackett 5, ne ne se 21-23n-2w	2664	4354
OKFUSKEE COUNTY—		
Burk Greis, Rhea 1, sw sw se 14-10n-9e	*	3895
OKLAHOMA COUNTY—		
Gulf Prod. Co., Schuster 1, nw sw ne sw 15-12n-3w	2846	6485
Ohio Oil Co., Dohl (Acct. 1), 15 se ne se 31-14n-3w	477	6710
OKMULGEE COUNTY—		
Okla. Oil Corp., White 1, sw se ne sw 5-15n-14e	5	1669
Royal O&G, Thomas 7A, nw ne ne ne 29-15n-14e	7	1680
OSAGE COUNTY—		
Pure & Sinclair Prairie, 177, nw sw sw ne 5-23n-8e	94	2795
Lewis & Phillips, 4, ne sw ne nw 9-24n-7e	45	2718
Lewis Prod. Co. 5, se nw se ne 20-24n-7e	50	2681
PONTOTOC COUNTY—		
Sinclair Prarie, J. H. Rogers 1, sw ne se 1-1n-7e	100	4288
Carter & Gulf, Wells 1, se se nw 2-1n-7e	184	4128
Continental, Thompson 2, sw ne se 2-1n-7e	612	4422
Magnolia, Norris 15, sw sw nw se 21-2n-7e	90	2622
Phillips, Leedy 1, ne ne ne 22-2n-7e	341	3996
Simpson & Crusaders, Wooley 1B, nw nw se 28-2n-7e	150	2423
Moore, Schauers 10A, se nw nw 29-2n-7e	26	2624
Moss Miller, Loyd 6, ne sw ne 6-3n-7e	*	1224
POTTAWATOMIE COUNTY—		
Atlantic, Damron 1, ne ne nw 22-6n-6e	632	3583
Gulf, Stahl 4, sw ne ne 30-7n-5e	144	4412
Stahl 7, ne nw ne 30-7n-5e (pb 4239)	314	4322
Smith, Cockrell 1, se sw ne 35-8n-4e (pb 3560)	*	3221
SEMINOLE COUNTY—		
Manahan, Scroggins 2, nw nw se 22-6n-6e (pb 2324)	140	2328
Beaver Oil Co., Conway 1, sw nw nw 33-7n-6e (pb 2912)	8	2985
Winona, C. F. sh 1A, se nw ne 19-7n-8e	*	3180
Sinclair Prairie, Rosanna 2, nw sw sw 28-10n-8e	350	4260
Lynch, Burton 2, nw ne nw 24-5n-5e	30	2509
Magnolia, Fee 64, 1, nw nw se 24-5n-5e (pb 2870) (otd 2603)	4	2876
McBride, Collins 1, ne nw nw 24-5n-5e	40	2489
Vierson O&G, Cynda 1, se ne sw 25-5n-7e	135	2270
STEPHENS COUNTY—		
Westheimer & Neustadt, Haws 2, ne sw ne se 4-2s-5w	7	1055
Geo. L. Pace, Allen 14, se se ne 3-2s-8w	475	3205
Jack Cohen, Pierce 1, ne ne nw 24-2s-6w	*	1879
TULSA COUNTY—		
Downing et al, Call 1, nw ne se sw 30-17n-14e	*	1502

*Failures; †Junked; ¶Million cu. ft. gas.

Tulsa.—Reports on traffic legislation and movements were presented at a meeting of the Petroleum Motor Transport Association of Oklahoma, held November 23 in the Tulsa building.



A dual purpose is incorporated into the construction pictured. The building in the background is a meter house measuring into the suction side of a compressor plant. The two vertical legs act as drips to catch any fluid carried through the dual meter setup, and in addition they tend to dampen the movement of the compressor pistons working against the incoming gas. Through this latter action, static and differential pens are less subject to vibration and consequently give more accurate measurement.

Billings Wilcox area indicated 900 acres

Tulsa.—Final stages in the development of Wilcox sand production at the Billings pool, Noble County, indicate that its limits will be confined within 900 acres and that ultimate yield will be 13,500,000 barrels.

Its 58 wells are located on 10 80-acre tracts, some of which are not drilled to their full one well to 10 acres density. Dry holes have determined limits to the west, southwest, south and southeast. Thinning of the sand body toward the east indicates that only a few more wells will be productive in that direction. The part of the field to be defined by future drilling is to the northwest, where 4 wells are active. A recent completion on the east side will draw 3 offsets. For the remainder of its development, locations will be staked as wells are completed either to the east or to the northwest.

The estimate of 13,500,000 barrels as the ultimate yield, is based on acceptance of 900 acres as the area of production and expectation of 15,000 barrels-per-acre yield. In the case of the area, maximum acres is taken while the estimate of yield is the minimum figures currently accepted as the expectation from the Wilcox sand at Billings.

Average thickness of the sand as drilled in present wells is 31.7 feet. This figure will be reduced slightly with future drilling, as the remaining wells will be completed where the sand is thinning toward the edge of the structure. Indications are that average thickness drilled in the field will be between 25 and 30 feet.

Since practice has been to avoid drilling into water, calculations of sand thickness fail to take into account the part of the formation between total depths and original water level. Recovery from the Wilcox sand has so many instances of exceeding 15,000 barrels per acre, that the figure seems like a low estimate of ultimate at Billings.

Another condition that should give the pool high recovery is the method of production. The field has been under proration since discovery with the result that only one of the 58 wells is on the pump. Up to November 1, total yield had been 1,507,703 barrels. Of this 1,366,336 barrels were produced in the 10 months of 1937.

Only one well is not producing from the Wilcox sand. This one, at the northwest edge of production, failed to find this sand and was drilled into the Simpson sand, where it established a low potential.

Although 900 acres have been accepted as the area of the pool, it is not likely that completion of the drilling campaign will result in 90 wells, or one well to 10 acres. A study of contour lines indicates that there will be no more than 80 wells when the field is drilled.

Wilcox sand production at Billings came on the calendar February 19, 1936, when McCaughtry 1-A, NEC 21-23n-2w, drilled by Phillips Petroleum Company and Shell Petroleum Corporation, established potential of 33,480 barrels, 23 feet in the Wilcox sand, topped at 4335 feet. A steady drilling campaign followed with four concerns in possession of the productive acreage.

KANSAS FIELDS

Will acidize potential discovery near Pawnee Rock.

* * *

Half-mile southeast extension for Letsch indicated.

* * *

Extension well of Trapp South pool running tubing.

Wichita.—Possibility of a new pool for Pawnee County was being watched for at one test; another well appears to be extending the Letsch pool. In Reno County a wildcat test was logging favorably, indicating it might find production, and a test north of the Cheny pool in Sedgwick County was circulating, preparatory to drilling ahead after finding a stain of oil in a core.

Stanolind Oil & Gas Company's Jentz 1, SWc 25-20s-16w, three miles northeast of Pawnee Rock in Pawnee County, made about one-quarter bailer of oil per hour after drilling the plug at 3809 feet in Siliceous lime. The well, two miles south of Pawnee Rock pool, will be acidized.

R. S. Shields et al's Giese 1, in Section 28-14s-13w, Russell County, had the Kansas City lime from 2903 to 2915 feet and filled 2000 feet with oil. No test had been made when late reports came from the well. It looms as a half-mile southeast extension for Letsch pool.

In Reno County Barnsdall Oil Company and Albert Austin's Schwiethold 1, SWc NE 17-23s-10w, northeast of production in the Zenith sand area of the county, had top of the Topeka lime at 2755 feet and was drilling below 2849 feet. Topeka lime was found approximately 12 feet lower than at C. L. Carlock et al's Brown Royalty Company 1, NWc NE 32-22s-10w, three miles to the north, which went to 3705 feet before being abandoned. Regional dip for the area is reported to be from 20 to 40 feet per mile.

A closely watched wildcat was apparently ready to call a halt early last week: The Texas Company's McCarroll 1, CWL NW 29-10s-17w, southwest of Codell in Rooks County, found the granite at 4190 feet. The well had been checking considerably lower than Earl Wakefield et al's Burnett 1, an Ellis County pool opener one mile south and five miles east of McCarroll 1. The Ellis County well was completed for a potential of 1890 barrels of oil at 3572 feet in Siliceous lime, topped at 3570 feet.

Continental Oil Company et al's Oehlert 1, NWc SE 7-27s-4w, wildcat just northwest of the Cheny pool in Sedgwick County, had top of the Viola lime at 4021 feet and cored to 4024 feet for a recovery showing a stain of oil. A second core, between 4024 and 4027 feet had a three-foot recovery with no show. Only dense dolomitic lime was found in bottom-hole cuttings after the test drilled to 4040 feet. It was circulating, preparatory to drilling ahead.

New work for the Habiger area of Rice County was started as Gulf Oil Corporation staked location for Stout 2, SE NE NE 6-18s-10w. The new test is an offset to Stout 1, recently completed for 5300 barrels of oil, producing from the Kansas City lime.

Has Good Rating

Shell Petroleum Corporation's Maier 1-A, NEc NW 2-16s-14w, south offset to the discovery producer in the Batt pool of Russell County, was given a temporary potential of 1134 barrels of oil. Production was from the Siliceous lime at 3337 feet. The test made 422 barrels of oil during an eight-hour test.

Extension well for the Trapp South pool of Barton County, Cities Service Oil Company's H. F. Bitter 1, NWc SE 8-16s-13w, one-half mile east of the pool, was running tubing to acidize. The well, drilled to 3384 feet in Siliceous lime, was reported standing with 2700 feet of oil in the hole.

Completion was reported for Fred Rust et al's Drach 1, NEc SW 12-22s-13w, recent pool opener for Stafford County, northwest of Hudson. It made 945 barrels of oil on potential, producing from 3709 feet in Siliceous lime following acidization. The well is on a cross-trend between the Gates and Hudson pools of the county.

In the Pawnee Rock area of Pawnee County, Mid-Continent Petroleum Corporation's Smith 1, NWc SE 13-20s-16w, was running seven-inch casing at 3762 feet. The test had top of the Siliceous lime at that depth and cored oil saturation from 3764 to 3770 feet.

KANSAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BARBER COUNTY—		
Barbara, Holmes 1-A, c se 28-23s-13w	*	4989
Stanolind, Komarek 12, nw se se 9-22s-11e	1689	3532
BARTON COUNTY—		
Stanolind, Thorn 1-B, sec 27-16s-13w	839	1369
Ohio, Stettenjer 2, nw nw ne 1-16s-14w	1629	3285
Darby, Burmeister 3, nw sw se 3-17s-11w	2153	3358
Stanolind, Kick 2, ne se sw 2-20s-11w	1441	3285
Schartz 3-A, ne ne nw 2-20s-11w	315	3314
Kowalsky 5, sw nw ne 11-20s-11w	1020	3295
Lario et al, Zohorsky 2-A, se ne nw 33-20s-11w	*	3485
BUTLER COUNTY—		
Morgan & Morris, Guenther 5, ne sw ne 29-26s-7e	60	2772
Trees, Sutter 1, ne ne nw 12-28s-6e	*	3209
Stewart & Gross, Piper 1, sw se nw 13-29s-3e	6	2255
ELLIS COUNTY—		
Ryan, Bemis 2, sw se nw 21-11s-17w	3093	3444
Cities Service, Johansen 6, sw ne ne 22-11s-17w	2072	3404
Deep Rock, Baumer 25, nw se ne 27-11s-17w	3143	3444
Bemis 2, nw ne sw 28-11s-17w	1974	3221
T. M. Deal, Bemis-Deal 2, nw ne ne 4-12s-17w	1669	3551
Brunson, Wessner 1, ne sw se 31-13s-17w	*	3624
ELLSWORTH COUNTY—		
Yockes Patzner 3, se se nw 30-17s-10w	1990	3284
GRANT COUNTY—		
R. K. Wilson, Brenham 18, 18-28s-37s	¶6	2660
HARVEY COUNTY—		
Olson, Scharg 5, ne ne sw 30-23s-3w	643	3279
McPHERSON COUNTY—		
H & M Drilling, Paterson 1, nw nw se 24-19s-3w	787	3009
Continental, Wenger 3, sw nw ne 32-21s-1w	569	3333
MITCHELL COUNTY—		
Seidhoff et al, Greiss 1, swc se 16-8s 10w	*	4053
PRATT COUNTY—		
Colonial et al, Phelps 1, sec sw 4-26s-12w	*	4325
RENO COUNTY—		
Stanolind-Amerada, Helger 5-A, sw nw nw 16-26s-4w	818	4038
RICE COUNTY—		
Stanolind, Hathaway 4, ne ne sw 33-19s-10w	*	3315
Obin-Long et al, Hubenett 2, nw nw sw 23-20s-6w	*	3432
Carlock, Deweese 1, se sw nw 32-20s-7w	494	3339
Sinclair Prairie, Knopp 4, 4-20s-10w	394	3348
Pryor & Lockhart, Hannenkratt 2, ne ne sw 8-21s-7w	1335	3345
Texas, Kleile 10-C, se ne sw 34-19s-10w	2110	3305
RUCH COUNTY—		
Morgan & Flynn, Schraeder 1, se se ne 26-18s-16w	*	3995
Carter, Pascoe 1, nwc 36-18s-16w	150	3594
RUSSELL COUNTY—		
Parks et al, Opdycke 1, swc 20-14s-13w	353	3180
Polcyn, Fee 2, se sw se 10-14s-15w	1417	3059
Transwestern, Polcyn 11, nec sw 11-14s-15w	2506	3059
W. I. Southern, Sellens 11, sw ne sw 29-15s-13w	1904	3228
Carolina, Sellens 8, ne nw nw 30-15s-13w	2233	3311
W. I. Southern, Boomhour 13-A, sw ne nw 30-15s-13w	434	3255
Phillips, Hoffman 12, ne se se 31-15s-13w	2931	3366
Cities Service, Bender 6-A, se se nw 25-15s-14w	2587	3317
Carolina, Deines 7, sw ne ne 36-15s-14w	2329	3291
Darby, Michaelis 6, se sw se 36-15s-14w	2078	3313
STAFFORD COUNTY—		
Stanolind, Pulson 1, ne ne sw 23-24s-11w	882	3899
STEVENS COUNTY—		
United, Beardsley 1, c n½ 12-31s-35w	¶4	2710
SUMNER COUNTY—		
Magnolia, Baird 1, sw se sw 2-30s-4w	378	4396
TREGO COUNTY—		
Phillips, Trego 1, c se nw 14-12s-23w	*	4267
WOODSON COUNTY—		
Pure, Winterscheidt 20, 6-24s-14e	¶	1553

*Failures; †Junked; ¶Million cu. ft. gas.

Mid-Continent water-flood operators will organize

Independence, Kan. — Twenty-eight men interested in water-flooding oil sands in Oklahoma and Kansas met here November 22 to approve immediate formation of an organization with membership comprised of operators of secondary recovery projects, active of proposed, in the northern Mid-Continent.

It was indicated that the group should concern itself chiefly with the manner of application of Mid-Continent secondary recovery projects in order to obtain as great an ultimate yield as economically possible. Engineering principles and new means of control were

mentioned as being primary considerations.

The possibility of sponsoring research, either independently or in conjunction with state or other interested bodies, was mentioned as being a possible function of the body. Dispensing of facts and general technical or engineering knowledge was outlined as being a fundamental object.

The observation was made that water flooding and secondary recovery has assumed the proportions of a new science, affiliated with, but strictly independent of, other means of crude oil production.

Hawkins Temporary Chairman

To make concrete plans for the association, and to propose limitations as to scope, the group present chose R. R. Hawkins of Parsons, Kansas, as temporary chairman, L. S. Reed of Garnett, as temporary secretary, and eight advisors as a committee, their report to be submitted to the general body at the next meeting.

In addition to the problems of organization, operators engaged in projects located from Tulsa to Franklin County, Kansas, freely brought up their work, showing desirable and undesirable findings. Lynn Converse of Converse Oil Company, Tulsa, discussed gas and the effects of pressure on solution and its direct relation to viscosity. Cut oils were mentioned, size and degree of shooting, the use of dyes to trace water vents or to head a water drive, and various other pertinent angles of recovery by water.

Comparison With East

Comparisons between Mid-Continent and eastern projects were made, and the difference in applications in the two areas were shown to be entirely distinct, and generally due to the differences in the texture of the sand body. In the same consideration, comparisons were made between gas and air repressuring projects as distinct from water flood projects, and attention was called to the relationship between permeability and the choice of manners used in secondary recovery applications.

Cooperation of interests was offered the operators by Dr. Eugene A. Stephenson, University of Kansas School of Petroleum Engineering, and by R. C. Mitchell, Kansas State Board of Health.

Gasoline plant for Sweden field

Corpus Christi. — Construction will commence shortly on a $250,000 natural gasoline plant in the Sweden district of Duval County to process residue gas from producing oil wells as well as from several wet gassers. The plant will handle approximately 8,000,000 cubic feet of gas per day.

This project is to be constructed by Duval Gasoline Company, a new $500,000 corporation which is composed of Standard Oil Company of Kansas and Benedum and Trees interests. The latter is represented through Republic Refining Company.

Officers of the new company include the following: D. M. Hovey, president; J. W. Blue, vice president; L. E. Loeffler, secretary and treasurer; Mike Griffith, Paul G. Benedum and R. C. Bowles, members of the board of directors.

NORTH AND WEST TEXAS

K-M-A west outpost spectacular producer.

★ ★ ★

Record level lease prices paid in several deals.

Wichita Falls.—Continued invasion of the K-M-A deep oil area, southern Wichita County, by operating units from East Texas and Oklahoma is boosting lease prices to record levels. Spectacular performance of Jack Kadane et al's C. A. Mangold 1, most westerly producer, recently completed with a natural flow of 2086 barrels of 44 gravity oil in 12 hours from Strawn sand at 3705-52 feet, with an elevation of 1026 feet, caused the late entrants to loosen their purse strings and pay the asking price in order to share in the big drilling program now gaining momentum.

Lease bonuses reached a new high when Sunray Oil Company, Tulsa, contracted to purchase from Kadane et al three tracts, aggregating 200 acres, situated immediately northwest and southwest of the record producer on the Mangold land, for $250,000 cash, and $250,000, payable from fourth of the gross production. Leases are in Blocks 37 and 38, P. Castleman Survey, A-35. Consummation of this deal is to be followed by an aggressive drilling campaign. Lewis Production Company acquired lease protection more than one mile further west in paying Consolidated Oil Company, Joe Howell et al $80,000 cash and $100,000 due from production for 96 acres out of the latter's W. P. Ferguson 516-acre lease, W. H. Spillers Survey, A-257.

Clint W. Murchison et al purchased 20-acre lease, consisting of the N½ NE¼ Block 36, P. Castleman Survey, A-35, about 2200 feet south of the Mangold well, from Preston Wood et al for $4,000 cash, and the latter reserved one-eighth over-riding royalty.

Deep Oil Development Company, discoverer of the K-M-A deep zone in 1931, is adding to its holdings, having joined with E. B. Clark in the purchase of lease on 67½ acres out of the west portion of the J. R. Hooks land, J. Scott Survey, A-255, for $140 per acre, 50 percent cash. Deep Oil Development Company held lease on a large portion of the area now holding the center of interest when its deep project was launched. The company surrendered lease on all but 2717 acres, of which 1335 acres was perpetuated by production, on January 1, 1933, in order to economize on rentals.

Shortage of machines for completing wells after reaching the Strawn saturated zone and cementing 7-inch pipe has not been relieved, but ample heavy duty rotaries will be available shortly. Drilling contractors from other fields that have experienced a slump in field activity are moving in, while many of the recent lease buyers are preparing to utilize their own equipment. Contractors are receiving $12,000 for the drilling of a test to the lime, and cementing pipe, but furnish their own fuel and water. The supply of water is somewhat limited locally, but a serious shortage can be averted by the stringing of a direct line to Lake Kemp.

Current field reports credit 24 tests as being in process of completion, else awaiting machines to drill in. There are 20 additional tests underway, and derricks and rigs on the ground for five projects. The field has 54 oil producers, and the proration allowable is 58 barrels daily.

Staley Oil Company is reported to have paid $25,000 cash for lease on the J. M. McFall 243.8-acre tract, H. B. Balch Survey, A-12, and McFall is to receive one-fourth instead of the customary one-eighth royalty. This lease is on a line between the two most easterly wells in the field.

No progress has been made by operators in their efforts to perfect an agreement on wider well spacing. General practice is to continue the 10-acre spacing heretofore used, although 20- and 40-acre spacing is considered the most desirable for sections of the field that yields small wells. A few land vacancies have been spotted by alert operators, and court action is pending. Considering the size of the field there are remarkably few leases of less than 20 acres. Wichita Falls Cotton Oil Company has started a test on its fee tract, which is 466 feet square, and located near the southwest corner of Lot 2, Block 1, F. Peterswick Survey, A-243, near the west extension producer.

Two Yoakum County fields get extensions

Midland, Texas.—Production limits of two Yoakum County areas were enlarged the past week by tests that will require offsets. Third producer for the Bohago deep lime pool was promised by Skelly Oil Company and Sun Oil Company's J. A. Kiser 1, C NE NE Section 640, Block D, which filled 300 feet with oil after penetrating eight feet into saturated zone topped at 5276 feet, or 1619 feet sub sea. It is about ⅞ mile southwest of discovery completion that made a small well at 1640 feet sub sea. Standard Oil Company of Texas' Sawyer 1, about ¾ mile north-

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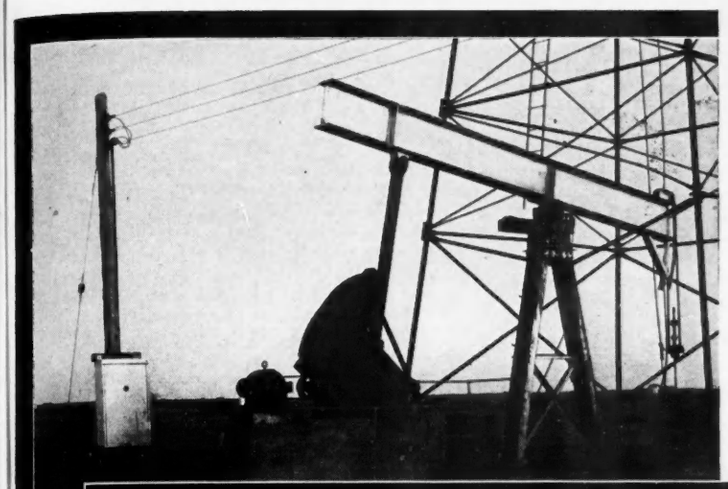

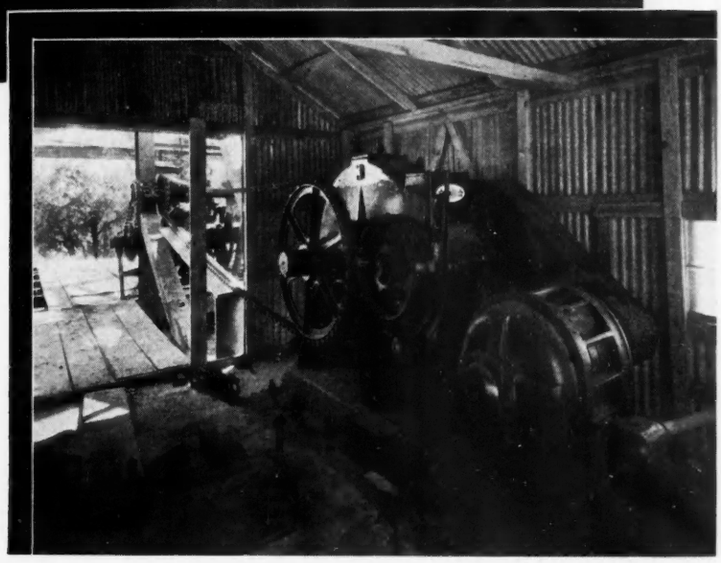

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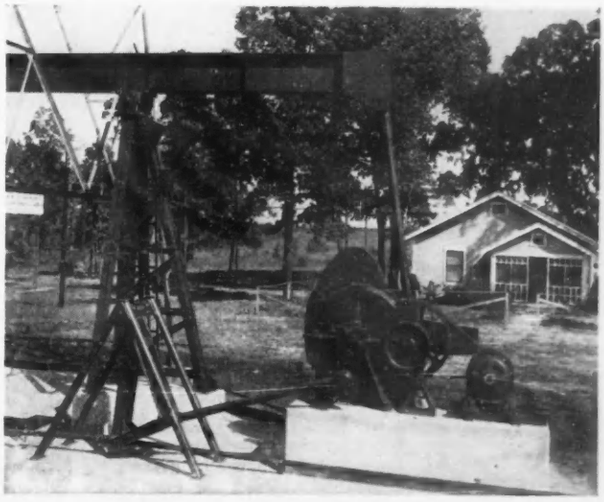

PETROLEUM ELECTRIC POWER CLUB

west of the original producer, swabs 4 to 9 barrels fluid hourly, testing 50 percent oil, after 1000-quart shot at 5190-5403 feet. Source of the water has not been ascertained, although field men inclined to theory the casing seat was damaged by the shot. Sawyer 1 is bottomed at 1734 feet sub sea.

Yoakum County portion of the Wasson field was widened one mile east of the first producer through the completion of Denver Producing & Refining Company's J. A. Whittenburg Estate 1-A, flowing 561 barrels oil initial after dual acid treatment of lime at 4935-5038 feet. It has an elevation of 3619 feet. Rig has been skidded one location east to drill Whittenburg 2-A, as the company has a continuous drilling clause in its lease contract on three sections, which are proved for production.

Pecos Trading Heavy

Heavy turnover of leases and royalty interests continued the past week along a general north and south trend from Magnolia Petroleum Company et al's J. H. McKee 1-A, northern Pecos County wildcat, on the strength of Ordovician production prospects. Lease prices ranged up to $50 per acre cash. Tex-Mex Petroleum Corporation (Abell Brothers), original sponsors of the project, were negotiating with Humble Oil & Refining Company the past week to sell a large portion of their remaining full interest acreage. McKee 1-A, located in H&GN Ry. Section 24, Block 9, immediately south of the Pecos river and on a direct geological strike to the southeast of the Sand Hills field, Crane County, was deepened from 4914 feet to 4928 feet the past week. No information was available as to whether the recovered cores carried oil saturation, or if casing is to be landed for a production test. Top of the Simpson, or middle Ordovician, was logged at 4775 feet, or 2390 feet sub sea. It is about 870 feet higher structurally on this marker than the nearest deep producer in the Sand Hills field, situated 11½ miles north by west.

Column of high gravity oil encountered by Ross Brewer and Collins' C. M. Caldwell 1, SW of PSL Section 14, Block 42, Culberson County, from Castile at 493-507 feet shows signs of exhausting after deepening to 560 feet. The large diameter hole filled 300 feet with 41 gravity oil within half hour after entering the shallow zone, which has been logged by previous wildcat projects in the county. Caldwell 1 is contracted to the Delaware horizon, and lease protection has been sold to about 12 independents.

NORTH TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ARCHER COUNTY—		
Dick Duncan et al, N. I. Andrews 11, blk 18	*	993
Van Wormer & C. W. Boller, Falls Co. 8, blk 62	35	1177
COOKE COUNTY—		
Gill & Witherspoon, O. Wilson 1	10	808
Pace Pet. Co., J. R. Winstead 1-B	50	1173
E. J. Ruwaldt et al, Andress 1	20	838
Trumter Oil Co., Andress 13	75	797
Andress 6-A	35	780
Andress 7-A	40	789
JACK COUNTY—		
J. B. Baker, Jr. et al, J. H. Wallace 1	*	525
Bennett Pet. Corp., J. S. W. Owens 3	225	3241
Burk Roy. Co., S. M. Jones 4	400	3125
Cockburn Oil Co., R. R. Clayton 2-A	532	3120
L. A. Long et al, W. J. Smith 6	259	2972
Hattie B. Madden et al, J. L. Mask 1, sec 2708	†	3013
Mullendore, Berry & Berry, R. R. Clayton 6-B	375	3086
Jack C. Shaffer et al, J. O. Hester-Skelly 1	¶4	2991
Taubert & McKee, Clayton 3	415	3012
WICHITA COUNTY—		
Bridwell Oil Co., H. Willis 21	*	356
H. Willis 22	2½	268
Deep Oil Dev. Co.-J. J. Perkins, Munger 1-F, blk 25	670	3885
Deep O. D. Co.-The Bonner Co., Munger 1-H, blk 30	510	3856
Munger 3-H, blk 30	732	3850
Forbess & Golden, C. A. Mertins 4	8	475
Golding & Cochran, Mrs. G. Jennings 2, sec 12	*	2119
King Oil Co. (was Amtex), J. L. Lockridge 1	9	479
Wichita River 2	5	481
Jack Kadane et al, C. A. Mangold 1	4172	3752
Petroleum Producers Co., First Nat'l Bank 78, blk 28	640	3858
Geo. Proctor et al, Foster-Allen 20-A, sec 1	*	1950
J. L. Swanner et al, Etheridge-McCormack 1-B, sec 6	*	1305
S. H. Walton et al, Will Burnett 10	8	482
YOUNG COUNTY—		
Fred Foote, Jr. et al, E. R. Williams 1, sec 1934	*	635
Rathke Oil Co., Lawson-Hill 1	42	4065
Sutton & Wellman, J. R. Garvey 1, sec 1857	*	810
West & Honea, G. P. Stewart 11, sec 1492	25	842
W. K. Roy. Co., J. A. Wright 1	*	4575

*Failures; †Junked; ¶Million cu. ft. gas.

Saturated lime reported in Ochiltree wildcat

Pampa, Texas.—Supported by a surrounding block of leases, aggregating 100,000 acres, Jas. R. Macon, Denver, et al's W. R. Norris 1, SW SE of H&TC Ry. Section 212, Block 43, Ochiltree County section of the Texas Panhandle, is preparing to run 5-3/16-inch casing after drilling to 5410 feet on a 7000-foot contract. This wildcat is reported to have logged saturation in lime at 5397-5407 feet, with an elevation of 2931 feet. The original block was assembled in 1933, and no rentals are involved during the 10-year lease contract as long as development is continued on any portion of the block. However, in the event of production 50 cents per acre annual rental applies.

Kewanee Oil Company, Tulsa, strengthened its position as one of the largest independent producing units in the Panhandle in acquiring Amtex Petroleum Corporation's properties for $1,400,000. This deal involves a cash payment of $300,000, and $1,100,000 payable from one-fourth of the gross production. Purchaser received 33 wells completed in the 3000-foot lime on the Tom Lewis tract, Hutchinson County, and an aggregate of about 1300 acres. The wells are prorated to 770 barrels daily.

Bob Murphy et al assumed at 20-well drilling obligation in acquiring lease from the J. A. Whittenburg Estate on the north 320 acres of H&TC Ry. Section 59, Block 46, Hutchinson County, for a bonus of $1250 per acre, payable from one-fourth of the 7/8 production interest. Contract calls for the forfeiture of lease on the undrilled 16-acre units within a given period. Continuous drilling obligations have been inserted in numerous Hutchinson County lease transfers within the past year.

WEST TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ECTOR COUNTY (Foster)—		
Barnsdall, H. C. Foster 5	613	4300
H. C. Foster 6	670	4272
J. L. Johnson 2	515	4290
Stanolind, E. F. Cowden 5-B	1138	4166
ECTOR COUNTY (Goldsmith)—		
Humble, C. Scharbauer 4-C	622	4205
Landreth Prod. Corp., C. Scharbauer 8-1	1811	4200
C. Scharbauer 2-K	496	4200
Rogers & Rogers, T. P. Land Trust 2-A	50	4307
ECTOR COUNTY (Judkins)—		
Skelly-Atlantic, University 1-D	441	3670
ECTOR COUNTY (North Cowden)—		
M. J. Delaney et al, Smith 1	406	4320
Stanolind, T. B. Roberts 9	1021	4330
ECTOR COUNTY (Wildcat)—		
Milhoan Drl. Co., B. H. Blakeney-Gulf 1	*	4502
GAINES COUNTY (Wasson)—		
Phillips-I.T.I.O. Co., E. C. Brand 1	65	5030
HOWARD COUNTY—		
Loring Bradstreet, Inc.-Arthur Lippa, Otis Chalk-Conoco 1	888	2983
Superior Oil Corp., D. Roberts 23-E	1152	3005
PECOS COUNTY (Torborg)—		
Stanolind-Conoco, J. H. Tippett 13-C	9	454
PECOS COUNTY (Yates)—		
Ohio Oil Co., I. G. Yates 57-A	33,888	1410
PECOS COUNTY (Wildcat)—		
T. N. Sloan-F. E. Lewis & The Sloan-Zook Co., D. Puckett 1	*	2973
UPTON COUNTY (McCamey)—		
Basin Oil Properties, Inc., Baker-Gulf 6-B	1145	2321
Continental, A. A. Reese 16	629	2641
Gulf, G. H. Rogers 9	475	2247
Peerless Oil Corp., T. E. Shirley-Conoco 1	537	2215
Shell Pet. Corp., D. Bowen 38	550	2204
G. J. Smith et al, A. S. Burleson 4	785	2155
T. P. Coal & Oil Co., J. F. Lane 28-A	525	2188
WARD COUNTY—		
Cities Service, J. Sealy Smith 4	199	2685
Clark-Mayfield & Frank Aldrich, Greene-Sun 4	798	2337
Gulf, E. W. Estes 46	221	2620
Humble, L. Richter 23	924	2605
Richardson Oils, Inc., Johnson-Sun 4-A	272	2940
T. P. Coal & Oil Co., M. Barker 12	405	2401
WINKLER COUNTY (Emperor)—		
Phillips, F. P. McCabe 4	166	3025
WINKLER COUNTY (Henderson)—		
Champlin & Bass, Inc., J. W. Hess 8	2538	3069
W. K. Royalty Co., J. B. Walton-Humble 1-B	1911	3075
WINKLER COUNTY (Hendrick)—		
Skelly, F. Leck 8-A	1200	3015
Stanolind-Westbrook-Thompson Hold. Corp., Hendrick 3-Q-T-88	138	3100
WINKLER COUNTY (Kermit)—		
Humble, J. B. Walton 9-B	257	3075
Magnolia, J. B. Walton 112	758	2920
YOAKUM COUNTY (Wasson)—		
J. W. Murchison-L. Fikes, C. A. Elliott 1	25	5070
Producers Inv. Corp.-American Liberty Oil Co., L. N. Clawater 1	224	5083

*Failures; †Junked; ¶Million cu. ft. gas.

TEXAS PANHANDLE Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CARSON COUNTY—		
Skelly, H. Schafer 89	783	3121
GRAY COUNTY—		
Cambrian Oil Co., G. Cole 4	637	3252
Cities Service, W. C. Archer 7-C	705	3270
I. B. Hughey 12-B	747	3272
P. A. Qorley 3	424	3146
Kewanee Oil Co., R. Arnold-Morgan 12, sec 49	542	3260
Magnolia, G. H. Saunders 4-B	440	2915
Plains Holding Co., A. Chapman 3-A, sec 10	478	2693
Sinclair Prairie, Pope 2	255	3297
Stanolind, Binkley 4	307	3193
W. G. Kinzer 7	302	3304
HUTCHINSON COUNTY—		
Dolomite Prod. Co., J. J. Perkins 3	602	3027
Phillips, R. C. Kay 2	556	3256
Stanolind, W. B. Haile 7-B	345	3057
R. C. Ware 12-C	515	3095

*Failures; †Junked; ¶Million cu. ft. gas.

Completion at Opelika assures exploitation.

★ ★ ★

Haynes discovery maintaining its output.

Tyler.—Continuation of exploratory work in the Opelika area, Henderson County, is assured by the successful completion of a gas and distillate well from the lower section of the Trinity series, thereby establishing two distinct pay zones. Tide Water Associated Oil Company et al's McElreath - Sugget 2-C, located 880 feet southeast of their partially junked discovery oil well, provided the incentive for more development in testing 63 barrels of 55 gravity distillate, plus 6 percent mud and wash water, in 19 hours, flowing through ½-inch choke. Gas volume was rated at 7,500,000 feet daily. Production is from the lower Pettit member of the Glen Rose, and appeared after gun-perforating casing with 68 shots at 8795-8890 feet, having previously plugged back to the latter depth from 9320 feet.

Owners plan to perforate pipe above this gas and distillate horizon to try for oil production, as gas conservation rules will prevent operation of the second Opelika well for its distillate yield unless a market is provided for the excessive gas output. No market is available, except in providing boiler fuel for future tests. The original deep project for the area flows 6 to 8 barrels 37 gravity oil daily from stray lime zone between the upper and lower anhydrite sections at 7195 feet, with drill pipe and bit cemented about 35 feet off bottom. Drill stem was frozen in attempting to pull out and test last April. The second project missed this upper oil zone, and did not show favorable in drilling to the Travis Peak, topped at 9073 feet, with an elevation of 452 feet.

Haynes Discovery

Discovery producer of the Haynes faulted structure, northwestern Henderson County, is maintaining its initial flow rate, but owners of nearby acreage plan to observe the performance of the well before formulating drilling plans. This wildcat was completed November 16 by Sherman Hunt, DeArman and McMillan on the A. R. Dillard 840-acre lease, Henry Jeffrey Survey, flowing 128 barrels of 44.8 gravity oil through 3/16-inch choke from perforated casing opposite the Woodbine at 3095-3105 feet. It has a gas/oil ratio of 190/1, and only a slight trace of water is present. Dillard 1 was a lower Trinity project, and drilled to Travis Peak section at 6429-6518 feet with negative results, then plugged back. Owners have sold 2000 barrels of oil to be delivered by tank trucks to an independent refiner at 90 cents per barrel at the well.

Previously drilled Woodbine failures in the Haynes area indicate that the producing limits will be narrow, and a comparatively thin sand body prevails.

Search for production in the Paluxy horizon on an intermediate faulted structure between the Talco and Sulphur Bluff fields has been undertaken by Stroube & Stroube's United Banks 1, northeast corner of the J. Bowman Survey, Franklin County. It is about three miles southeast of Hagansport. Drilling was resumed after cementing surface pipe at 110 feet.

Reduction of the proration allowable of wells in the Talco field from 63 to 55 barrels on November 16 is expected to force a general shut-down on drilling by independents. Low gravity oil produced in this original Paluxy field commands a posted price of 73 cents per barrel, the lowest posting in the southwest, and more than 50 percent of the wells are making a large volume of water.

EAST TEXAS

Completions

Company, Well and Location	Init. Prod Bbls.	Depth
JOINER AREA—		
Atlantic, Kinney 46 (336-ac)	1500	3664
Pinkston 14-C (84.29-ac)	1200	3666
East Shore Oil Co., Tom Fox 10 (40-ac)	6800	3682
F. W. Fischer et al, McElroy 4 (6½-ac)	6000	3768
Gulf, Mayfield 9-D (53.91-ac)	4500	3639
Humble, S. A. Glover 9 (59.44-ac)	4200	3729
Hunt Oil Co., J. M. Finney 9 (32-ac)	500	3706
Magnolia, Dan Kelly 9 (55-ac)	960	3660
W. W. McDonald-R. B. Campbell, J. W. Wheelis 6 (9.91-ac)	7000	3780
Ohio, R. M. Weaver 4 (36.98-ac)	4200	3621
Royal Pet. Corp., T. H. Goforth 10 (40.52-ac)	3000	3771
A. V. Riley et al, Geo. Curbo 3 (120-ac)	*	3502
Geo. Curbo 4 (120-ac)	48	3674
Sinclair Prairie, Dora Wright 30 (152.1-ac)	5000	3752
J. B. Sneed et al, Green Gossett 4 (16.63-ac)	2500	3676
Sonbar Corp., A. P. Finney 16 (62-ac)	3000	3680
Stanolind-Pure Oil Co., Ras Lacy 5 (100-ac)	50	3624
Texas-Jersey Oil Corp., G. W. Eaton 4 (1.26-ac)	5500	3752
Tide Water Associated, L. J. Pinkston 23 (134-ac)	7000	3785
Ward Oil Corp., F. J. Cox 5 (20-ac)	2400	3688
KILGORE AREA—		
E. W. Barr-J. S. Johnson, E. S. Barker-Sun 3 (21½-ac)	3600	3719
W. A. Brown et al, W. Cheesborough 2 (2-ac)	4000	3551
Frank DeMayo Oil Co.-Glen A. Pace, D. Wills 2 (10-ac)	2500	3666
C. A. Everts Drl. Co., P. E. Barton 3 (1.1-ac)	3600	3592
Gen'l Crude Oil Co., L. Howard 11 (38-ac)	9700	3619
Erle P. Halliburton, Inc., W. D. Lacy-Shell 12-B (63.3-ac)	1200	3600
Humble, J. A. Knowles 26 (100-ac)	4500	3604
J. A. Knowles 28 (100-ac)	4000	3621
T. A. Johnston & Owens, M. T. Cole 11-B (33.7-ac)	9200	3514
Natural Pet. Co., J. Henderson 8 (42.7-ac)	96	3598
J. S. Rushing et al, J. M. Dickson 4 (16.66-ac)	7000	3581
Shell, B. F. Laird 7-B (48.82-ac)	5500	3606
Sultana Oil Corp., Sabine River 2-A, Tr. 6 (41-ac)	3000	3546
Sun, Hilburn-Loyd 33 (133.7-ac)	4800	3655
Sun-Seaboard, M. T. Cole 55 (266.17-ac)	8500	3570
Trentman Oil Corp., M. Thomas 10 (40-ac)	96	3726
Ward Oil Corp., J. A. Beall 11 (79-ac)	3600	3711
Wellington Oil Co., C. Dodson 3 (13-ac)	8800	3629
John Wrather et al, G. H. Morris 2-B (10-ac)	480	3704
LONGVIEW AREA—		
Amerada, D. B. McPherson 7 (40-ac)	7600	3593
Atlantic, W. P. Duncan 25 (154.7-ac)	10,000	3757
Atlantic-Sun, Wm. Anderson 17 (83.27-ac)	8000	3545
A. P. Carr et al, G. W. Richey 2-B (6.07-ac)	8400	3551
Clark-Cowden Drl. Corp., J. M. Christian 11-A (42¾-ac)	9800	3656
F-H-E Oil Co., J. E. Christian 10 (33-ac)	8200	3630
Fleming-Kimbell Corp., J. Barnes 11 (30-ac)	10,200	3660
Gilcrease Oil Co., A. Christian 10 (31.61-ac)	8000	3575
Erle P. Halliburton, Inc., A. R. Loden 11-C (54.6-ac)	7600	3641
Humble, E. Edwards 11 (73.3-ac)	5000	3614
J. K. Edwards 35 (271.6-ac)	6300	3665
Kesson Oil Co. (was Joe Wright), L. T. Mackey 4 (20-ac)	160	3665
L. G. & S. Oil Corp., W. D. McQueen 7-A (94.54-ac)	1500	3574
Magnolia, L. J. Everett 31 (166.96-ac)	5500	3653
W. E. Jones 20 (116¼-ac)	9000	3675
Overton Ref. Co., Callahan 1 (10-ac)	*	3853
W. L. Pickens et al, T. Wells 11 (40-ac)	5400	3720
P. R. Rutledge-C. W. Boller, P. Todd 19 (157-ac)	240	3749
P. Todd 20 (157-ac)	300	3789
Selby O&G Co.-Lewis Prod. Co., Snavely 2-B-a (361.2-ac)	6000	3583
Shell, E. G. Richey 32 (169.4-ac)	9200	3610
Sinclair Prairie, M. Lawson 19 (84.19-ac)	9000	3520
Stanolind, Adrian-McCrary 13 (65.64-ac)	6500	3525
Stanolind-The Falcon Co., J. B. Cloud 5 (36.24-ac)	3000	3675
Stanolind-Conoco-Tide Water, Flewellen 28-C (200-ac)	2400	3643
J. E. Watts et al, E. O'Byrne 21 (60-ac)	2500	3803
J. A. Woods et al, J. H. Sobey 4 (20-ac)	3000	3689
ANDERSON COUNTY (Cayuga)—		
Tide Water Associated-Seaboard, L. E. Harton 3-A (106.48-ac)	1500	4088
V. C. Wortham 5 (100.87-ac)	2500	4081
FREESTONE COUNTY (Cayuga)—		
Amerada Pet. Corp., H. Berk 2 (1057-ac)	3000	4026
HENDERSON COUNTY (Cayuga)—		
Sanders & Murchison, M. Watkins 2 (40-ac)	1200	4112
TITUS COUNTY (Talco)—		
Lucey Pet. Co. et al, I. N. Williams 11 (319.85-ac)	392	4283
Magnolia, L. Blackburn 2 (80.51-ac)	415	4300
K. Mainard 14 (130¾-ac)	252	4300
HENDERSON COUNTY (Wildcat)—		
S. Hunt, DeArman & McMillan, A. R. Dillard 1 (840-ac)	128	6518
NAVARRO COUNTY—		
Nowlin, W. W. Lechner et al, J. Easterling 1 (211-ac)	*	2663
UPSHUR COUNTY—		
J. K. Wadley et al, W. R. Thornton 1	*	3890
MARION COUNTY (Rodessa)—		
Fohs Oil Co., W. T. Neilon 1, R. Bennington sur	385	6090

*Failures; †Junked; ¶Million cu. ft. gas.

SOUTHWEST TEXAS

Fifth sand found in Heyser field.

★ ★ ★

New pay and extension for Luby pool.

★ ★ ★

North Sweden and Oilton are extended.

Corpus Christi. — New sand discoveries in Heyser and Luby fields, together with showings in several other wildcats, provided main interest during the week along South Texas Gulf Coast.

Gulf Oil Corporation's T. P. Traylor 1, on the northwest side of the Heyser field in Victoria County, flowed 5.7 barrels of oil per hour through 9/64-inch choke after perforating at 6032-34 feet. The well had drilled to 6037 feet, five feet in sand and liner was set on bottom. The test is flowing under pressures of 875 pounds on tubing and 1900 pounds on casing. It is the fifth sand for the field and first below 6000 feet.

Between the Placedo and Keeran fields, Victoria County, Stanolind Oil & Gas Company is preparing to gun perforate Henderson & Pickering 1, which was drilled to 7502 feet. Casing was landed around 6500 feet for tests above that level.

Richardson Petroleum Company perforated at 4084-88 feet in Bertha Cunningham 1, one mile northeast of the Luby field, Nueces County, and the well has been completed as a large gasser spraying some oil. It is flowing through 5/32-inch choke showing pressures of 1300 pounds on tubing and 1400 pounds on casing. No details are available on the well, but it is approximately 300 feet higher than any other sand now productive in the field. The test is in the northwest corner of the south one-half of Section 77. The company has commenced another wildcat northeast of the field being J. O. Chapman 1, in the southwest corner of the north one-half Section 43.

Refugio Townsite Extensions

Refugio townsite activity sees a further increase with minor extensions being effected through the completion of several outpost wells to the new 7100-foot sand.

In western San Patricio County, 1½ miles north of Mathis, Argo Oil Corporation's A. Soehnge 1, Delgado Grant, is swabbing after perforating at 4841-46 feet. The well is swabbed daylight tours and shut in night. It builds up a little pressure and flows some mud and wash water, but no oil as yet. The test drilled to 6310 feet but plugged back to the sand at 4836-56 feet. This horizon is in the Vicksburg about 80 feet above the Jackson.

H. H. Howell et al's (carried by some as Pratt and Tesmelis) J. R. Talbert Estate 1, just southwest of Alice in Jim Wells County, is swabbing after perforating casing at 3595-3610 feet. The well originally drilled to 5530 feet, made production tests through perforations in several sands above the present level, but none showed sufficiently to warrant completion. The new level gave up a little oil and some pressure and further attempts are being made to complete as a discovery well of a new field. The potential discovery well is in the southwest corner of a 187-acre tract in the La Vaca Grant.

Magnolia Petroleum Company's Seeligson 7, southeastern Jim Wells County, after plugging back from 8165 feet, tested 3000 feet of salt water with a small amount of gas in 22 minutes after perforating at 6713-23 feet and it again is being plugged back for further tests.

Extensions for North Sweden and Oilton

San Diego.—Further extension to the North Sweden field, Duval County, is indicated with Frank J. Gravis' F. Vaello 1-A, San Andres Grant, finding shows in upper sands productive in the field. The test is one-half mile north and a little east of Woodley Petroleum Corporation's east outpost producer.

In the top sand of the regular producing group, the well recovered 40 feet of oil cut mud, a few gallons of free oil, no pressure, but a fair gas blow in 15 minutes. The test was at 4769-78 feet, which was said to be mostly sand. Cores to 4790 were sandy shale.

Circle Oil Company's Merle West 1, extreme southwest outpost of the north field, showed for a large gasser in the Cole or top sand at 3890-3912 feet, lensed out the regular 4700-4800 zones, but found good saturation in the Pettus or Navarro sand at 5343-53 feet, where casing has been set. It now looks as though the sand zone to the south of the field will be the only direction in which the regular pay will be extended, while the Pettus zone will be prolific along the western side of the structure.

Oilton Extended

J. R. B. Moore and Paul L. Meaders apparently provided a one mile north extension to the Oilton Pool, Webb County, when their Garcia and Villareal 1, SE NE Section 338, recovered 350 pounds pressure with a little oily mud test of sand at 1903-19 feet. The test failed to find any shows below 1919 feet and was coring for the Rosenberg around 2350 feet.

The Killam-Oilton district, producing from 1850 to 2200 feet, is one of the most prolific shallow spots in the lower Mirando sector. Its producing limits, now virtually merged, cover an area nearly four miles long, north to south.

Hoffman Enhanced

Possibilities of the Hoffman field, Duval County, in the Government Wells sand were brightened when Cox and Hamon's Cuellar-Points 1, Section 117, southermost well in the field, flowed 36.85 barrels of oil on a four-hour gauge through ⅜-inch choke under pressures of 100 pounds on tubing and 350 pounds on casing, oil sand being logged 2808-11 feet. Most of the completions are through a thin oil sand section at the base of a gas zone and production is obtained via gas injection. A flowing well of the above proportions places a much different light on the situation in this portion of the field.

McMullen County's Ezzell Ranch field, likewise, comes to the fore with Harry Ezzell's Fee 7-A, Section 21, flowing 1027-16 barrels of pipe line oil in 24 hours through open tubing. The test is in sand at 1489-1500 feet. It is on the northwest side of the producing area, indicating test at the top of the structure likely will be comparatively large flowing wells.

This field's first development in the Nueces River is in prospect with J. E. Matthews staking locations for five tests along the river bed. He is waiting on permit.

Frank Gravis Crude Oil Company will carry R. Schallert, Section 239, Duval County, near Palangana Salt Dome, to 7000 feet. It is down 3220 feet and 10¾-inch surface casing is being set at 1000 feet.

Magnolia Petroleum Company's D. C. R. C. 1, Section 261, three miles northwest of Eagle Hill, has been abandoned at 3725 feet. It is one of the deepest tests thus far drilled in this portion of Duval County.

Goliad test watched

Beeville.—Efforts to open a new Vicksburg sand field in southwestern Goliad County are being made by Rual B. Swiger et al in Carrie Wood 1-B, which topped a sand at 5013 feet showing oil and gas. A drill stem test of the first five feet of the formation recovered 140 feet of oil and 30 pounds pressure in 10 minutes, packer being set at 4967 feet. It was cored ahead to 5023 feet and a new drill stem test made of the sand section in which 400 feet of oil, some oily mud, no water and a light gas blow were recovered in 12 minutes. The test was drilled to 5043 feet, finding sand at 5013-23 feet and shale at 5023-43 feet. Casing was set on bottom and the well will be completed through perforations.

This well is 466 feet west and on a projection of the common line of the Bundick and Heard Surveys but in the John Shearn Survey. It is in the vicinity of several wells drilled by Swiger, Keystone Royalty Company and others, all of which had some sort of showings.

It has an elevation of 112 feet, der-

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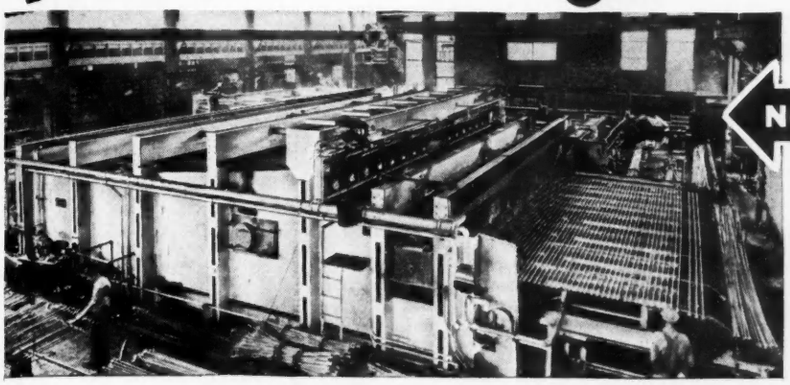
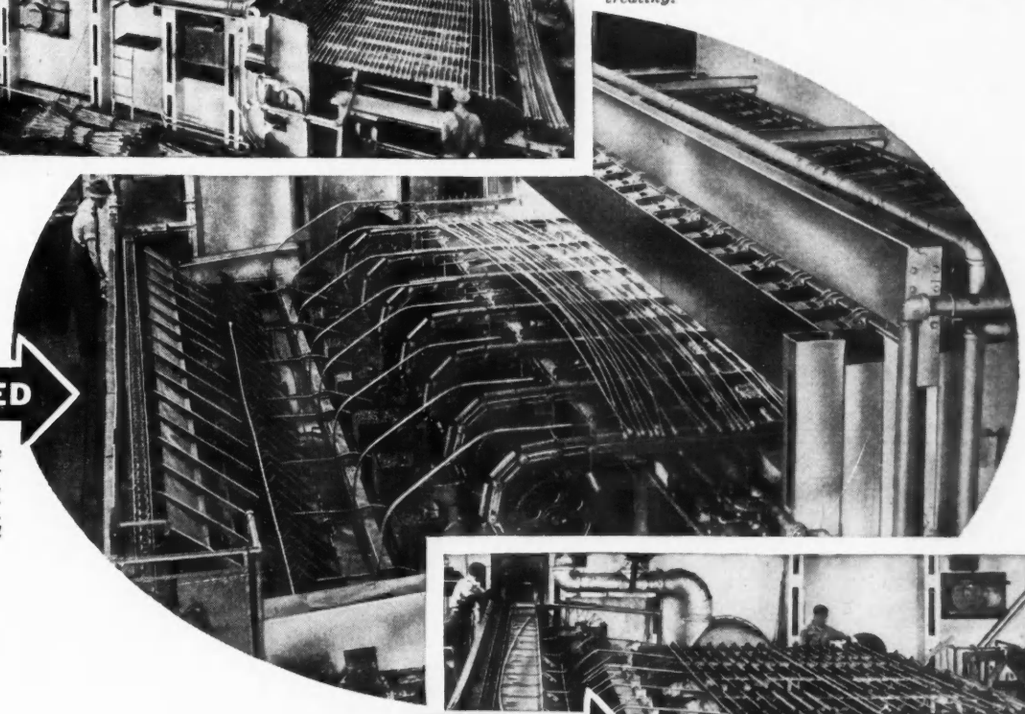


NORMALIZED

Full heat-treatment of "Oil-well" Nickel Alloy Steel sucker rods follows exacting process control from the ore through smelting and steel making into scientific upsetting to insure proper grain structure and flow of the metal. This modern furnace is pyrometer controlled to insure accurate heat-treating.



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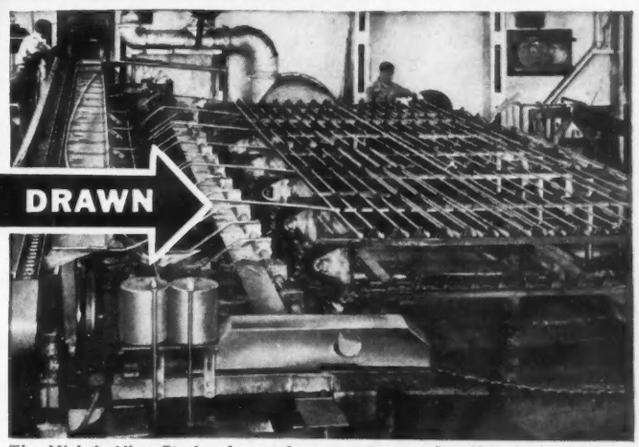
Nickel Alloy Steel rods are quenched over their entire length in one heat. Recording pyrometers precisely control the temperature of the steel and fluid medium.



DRAWN

The Nickel Alloy Steel rods are drawn or tempered uniformly from end to end at proper temperatures. These rods are now tough and ductile and of uniform strength over their entire length.

● The success of Nickel Alloy Steel sucker rods has been outstanding because they combine the three prime requisites for this service:

(1) High strength and resistance to repeated stresses.

(2) Great toughness and ductility.

(3) Superior resistance to corrosion and hydrogen sulphide embrittlement.

The Oil Well Supply Company has developed a full heat-treatment process of normalizing, quenching and drawing long, small diameter rods which assures these valuable properties in the highest measure.

This company manufactures Nickel steel sucker rods in grades "T" and "S", having 1¾% and 3½% Nickel respectively. Enthusiastic users report that the slightly higher cost of these rods is many times repaid by their lengthened life.

Consultation on problems involving the use of Nickel is invited.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N.Y.

rick floor. Heterostegina was topped at 3091 feet.

In the same county, but just south of Goliad, Goliad Oil Company's S. E. Cole 1-A, at La Bahia, was testing again. Liner was set at 5609 feet, bottom of hole being 5687 feet, and perforations were made at 5584-96 feet in the Cockfield, where the test failed to come in. Additional perforations were made at 5305-25 feet and 5080-5100 feet, the latter now being tested.

Valley Wildcats deepened

Mission.—Atlantic Refining Company was drilling ahead in American Rio Grande Land and Irrigation Company 1, 2½ miles southwest of Weslaco, Hidalgo County, after drilling plugs in 7-inch casing at 8505 feet. The test likely will be carried to below 9000 feet unless production is encountered.

Gulf States Oil Company's Delta Orchards 2, one mile west of the north end of the La Blanca field, Hidalgo County, was reported to be below 6700 feet without encountering sands showing for production.

Another interesting wildcat in the Rio Grande Valley district is Sal Viejo Oil Company's Garcia 1, seven miles northwest of Raymondville and in Kenedy County. It is near 7000 feet, contracted to below 8500 feet.

Across the line in Willacy County, Shell Petroleum Corporation was progressing below 8280 feet in Yturria 2, while Magnolia Petroleum Company's Armendiaz 1 is at 7145 feet repairing boilers.

Transwestern Oil Company's Slick School 1, in central Starr County is having considerable difficulty. After recovering drill pipe to 6702 feet, 158 feet off bottom, an attempt was made to condition the hole before setting protection string of pipe, but circulation failed.

Start gasoline and carbon black plants

Corpus Christi.—Work will be commenced immediately on Warren Petroleum Company's natural gasoline plant, which is to process residue gas from the McCampbell field, Aransas and San Patricio counties. The plant will have a capacity of at least 75,000,000 cubic feet per day and will manufacture around 35,000 gallons of gasoline. The unit will cost about $350,000.

Contract has been made with Atlantic Refining Company, principal producer in the field, and other operators for their residue gas.

Carbon Black Plant

A 10-year lease with option to extend another 15 years has been made on 44 acres of the Rowena Shaeffer-McCampbell tract in Survey 421, just west of the Viola townsite in the Saxet field, where Columbian Carbon Company will build South Texas Gulf Coast's first carbon black plant. The lease, which fronts on the S.A.U. & G. Railroad, was contracted for by this concern with permission to erect a carbon black, gasoline and other plants for the manufacture of other gas by-products. The company is to purchase tail gas from Southern Minerals Corporation's natural gasoline plant.

Marine Drilling in Store for South Texas

San Antonio.—An extensive Marine program in the bays and other waterways of the South Texas Gulf Coast is in evidence with more applications being applied for to either drill wells or carry on exploratory operations. Four fields of this area already have been developed to a point where additional drilling will be required in the tidewater.

Flour Bluff, Nueces County, has been extended to Luguna Madre and within the next several weeks at least two 6650-foot tests are expected to be commenced in the water. This is partly as a result of contracts entered into when companies acquired leases from the State of Texas. Saxet, another Nueces County field, has production in the shallower lakes with production extended to the shores of Nueces Bay. Production is as deep as 6900 feet in this portion of the field.

L. F. Brothers has filed application at the U. S. Army Engineers' office in Galveston for permit to erect structures for drilling and producing of oil, gas and other minerals four miles southwest of Matagorda in Matagorda Bay, the location being in state tract No. 4, and in Swan Lake of Calhoun, Victoria and Jackson counties, including state tracts Nos. 12, 14, 15 and 16.

Hantho-Nelson, Inc., has applied to the War Department for a permit to build piers and drill several wells actually in the Gulf of Mexico. They would be located just south of the south jetty of the pass. At the other end of the county, 7500-foot production opened at Lamar by the Barnsdall Oil Company indicates that a greater portion of the field's program will be in the water.

At Riviera Beach, where a wildcat drilling program is being carried on with the expectancy of opening a new deep Kleberg County field, also may lead to marine development as considerable of the structure worked out by geophysics is on the water side of the area.

Tide Water Associated Oil Company applied for a permit from the U. S. Army engineer's office for permission to place temporary pipes in Laguna Madre for the purpose of carrying on seismograph work. In Calhoun County, Stanolind Oil & Gas Company has applied for a permit to place explosive charges in holes to be bored in the floor of Lavaca and Matagorda bays for the purpose of seismograph exploration.

Marine seismograph and other geophysical work is not new in the South Texas Coastal area, but the fact that the work has uncovered interesting possibilities brings to light the probability of a rather extensive program for additional geophysical work as well as actual drilling.

SOUTH TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
SAN ANTONIO DISTRICT		
BEXAR COUNTY—		
Earl M. Baker, E. M. Baker 5, F. Rolen sur 48 (Von Ormy)	4	665
Roger Putnam, Simon & Anna Wetz 1, J. S. Simpson sur (Von Ormy)	4	660
CALDWELL COUNTY—		
Lincoln Pet. Co., F. M. Branyon 6-B, J. R. Miller sur, (Branyon), owdd, former td 2155 ft.	55	2348
W. W. Linden, J. H. Compton 1, Pablo Martinez sur, 1200 ft nel, 1500 ft nwl of farm	*	1750
Martell Pet. Co., Searcy Smith 1, A. Floyd sur (Salt Flats)	25	2670
R. B. McElroy et al, C. King 1, N. Reaville sur (Luling)	35	2103
McNeill Pet. Co., F. Marino 1, 180 ft nel, 500 ft sel, sw 20-ac of 56-ac tr, I. Allen sur	124	1749
Murchison Clsuit, Reed et al, Hattie Jennings 1, John Henry sur (Luling)	75	2097
Spokane-Oklahoma Oil Co., W. F. Davis Est. 1, A. Floyd sur (Salt Flats)	50	2512
GUADALUPE COUNTY—		
Taylor Ref. Co., B. H. Harris 2, H. Cottle sur (Luling)	40	2118
Texas Co., A. E. Dowdy 3, Jacob Durst sur (Darst Creek)	125	2540
Wellington Oil Co. of Dela., A. Koepp, Wm. H. Smith sur, 250 ft wl, 1650 ft sl, 136-ac tr	*	1800
MEDINA COUNTY—		
R. J. Taylor, Fee 3-A, A. Bruchet sur 135 (Taylor)	*	315
Charles H. Wagener, Medina Irr. Farms 16-A, M. W. Hewitt sur (Chicon Lake)	1	245
Medina Irr. Farms 17-A, M. W. Hewitt sur (Chicon Lake)	1	240
Medina Irr. Farms 18-A, M. W. Hewitt sur (Chicon Lake)	1	250
MILAM COUNTY—		
Kingdorr Exploration Co., M. Stidham et al 1, 4100 ft nel, 7300 ft sel, J. P. Jones sur (Jones Prairie)	*	3816
WILSON COUNTY—		
W. A. Richardson Pet. Co., E. M. Hierholzer 1, 5415 ft el, 2430 ft sl, R. Salinas sur	*	1265
CORPUS CHRISTI DISTRICT		
CALHOUN COUNTY—		
Al Buchanan and Blanco Oil Co., Morris-Dunwoody 3, A. Sisneros sur (Heyser), perf 5490-95 ft.	500	5605
Normandie Oil Corp., J. G. Cook 9, A. Sisneros sur (Heyser)	650	5743
JACKSON COUNTY—		
Temple Hargrove and Wynne Crosby, Hodges 1, center lot 65, 1st reg. subd, La Ward Farms sur 7, 40-ac tr out of 600-ac blk, I&GN RR sur 7	*	6523
KARNES COUNTY—		
Magnolia, Guy Porter 19, B&B sur 23 (N. Pettus)	33	3687
LIVE OAK COUNTY—		
Lewis Franklin, Lloyd Odem 1, R. Everett sur, 300 ft nl and wl of 54-ac tr, blk 34	*	2032
NUECES COUNTY—		
Seaboard, Luby 2, Canutillo Ditch Colony sur (Luby)	500	5074
Southern Minerals Corp., Anton Ocker 9, Page Lands subd (Saxet)	400	4871
Stanolind, G. H. McCann 4, Canutillo Ditch Colony sur (Luby)	500	5061
REFUGIO COUNTY—		
Morgan & Simmons, Lambert 1-A, I. W. Arocha sur (Refugio)	650	6222
L. A. Nordan, Tom O'Connor 1, J. M. Swisher sur 6 (Tomoconnor)	1125	5978
South Oil Corp., Heard 19, Refugio Town gr (Refugio)	425	4920
SAN PATRICIO COUNTY—		
Tom Graham Oil Co., Edwards 2, lot 16, sec 7 (McCampbell)	725	7144
Humble, J. W. Mayo 32, J. H. W. Ottman sur (Taft)	425	3992
Plymouth, E. H. Welder 86-C, sec 70 (Plymouth)	500	5645
E. H. Welder 87-C, sec 70 (Plymouth)	500	5645
E. H. Welder 88-C, sec 70 (Plymouth)	500	5645
VICTORIA COUNTY—		
Gulf, T. P. Traylor 1, J. E. Galban sur (Heyser), owdd, former td 5589 ft	700	6037

Company, Well and Location	Init. Prod. Bbls.	Depth
LAREDO DISTRICT		
DUVAL COUNTY—		
Cox & Hamon, Cuellar (C. W. Points) 1, sur 117 (Hoffman)	275	2813
O. W. Greene 12, sur 118 (Hoffman)	49	2768
Rodney DeLange, P. T. Wright & Vela 11, sur 72 (Loma Novia)	45	2656
N. V. Duncan, Worden-Drought 17, sur 151 (Charamousca)	425	1550
Gulf Stream, Inc., W. K. (Sophie) Hoffman 6-B, M. Ruiz sur (Hoffman)	40	2770
Magnolia, DCRC 1, BS&F sur 261, 330 ft nl, 2310 ft wl, 640-ac tr.	*	3725
John J. L'Hern, Maria B. Volpe 1-G, 2355 ft wl, 968 ft nl of n½ of nw¼ of sur 170, owdd, former td 2970 ft	*	3193
Standard of Kansas, Lillian Starr 4, San Andres gr (N. Swede)	450	4784
Mabel Rossi 4, blk 10 (N. Sweden)	500	4793
McMULLEN COUNTY—		
Harry Ezzell, Fee 3-A, A. Glavecke sur 1 (Ezzell)	186	1495
Fee 5-A, A. Glavecke sur 1 (Ezzell)	302	1553
Fee 7-A, A. Glavecke sur 1 (Ezzell)	1027	1525
Gilcrease O&G Co., A. C. Miles 1, Charles Stephens sur, 1840 ft wl, 5150 ft sl	*	2737
STARR COUNTY—		
Moss & Heard, S. B. Ricaby 6, 7388 ft n of MP RR, 150 ft wl of por 83, J. of Camargo	*	1765
WEBB COUNTY—		
Mills Bennett Prod. Co., A. E. Gates 1, sec 200, 300 ft sl and wl of blk 28, Purnell subd	*	2813
Bridwell Oil Co., Maria G. Martin 12, T. Guerra sur 2167 (Oilton)	145	1906
Cox & Hamon, A. A. Garcia 4, C. Hughes sur 262 (Oilton)	110	1916
J. R. B. Moore, Laredo Nat'l Bank 2, sur 1005 (Oilton)	167	1925
Randon Oil Co., Schott & Killam 1, 330 ft nl and wl of nw 10-ac of lot 3, sur 471	*	1810
Rowan & Hope, Inc., Laurell Bros. 12, sur 1006 (Oilton)	130	1929
ZAPATA COUNTY—		
Coyle & Callaway, F. Flores 1, 1980 ft nel, 1550 ft sel of F. Flores 1650-ac tr, por 37	*	2506
Dulup Oil Co., I. G. Trevino 30, sur 412 (Escobas)	*	467
Texas Co., Whitehead 110, Cerrito Blanco gr (Escobas)	75	1278

*Failures; †Junked; ¶Million cu. ft. gas.

Lockhart discovery flows 62 barrels in 12 hours

San Antonio.—McNeill Petroleum Company's F. Marine 1, discovery well of a new pool four miles northwest of Lockhart, Caldwell County, flowed 62 barrels of 18 gravity black crude on a 12-hour gauge. Production is coming from a broken section of limestone at 1749 feet, casing being set 15 feet shallower. It is possible that this production is coming from the Edwards section or one of the formations immediately overlying it.

The importance of the new well is doubtful at this time. In that it is undoubtedly a crevice well, more drilling will be required to definitely determine if the field will be of any proportions. The discovery well is in the I. Allen Survey.

I. H. Wilson is testing an Austin Chalk showing in C. A. Alexander 1, D. Benton Survey, five miles northeast of Lockhart in Caldwell County. The well topped Austin chalk at 1810 feet, drilled in 40 feet and set casing at 1800 feet. It is expected to make a small well at its best.

After encountering a small oil show in the Austin Chalk which proved insufficient to make a commercial producer, Wellington Oil Company of Delaware deepened Albert Koepp 1 to 1800 feet, 24 feet in the Edwards limestone where it has been abandoned. The well showed asphalt in the uppermost section of the limestone. The test is on the New Berlin prospect in Guadalupe County.

Amerada Petroleum Corporation is drilling plugs in R. Nelms 1, one mile east of the Pearsall field, Frio County. The well was drilled to 3890 feet with rotary, where casing has been set. It is checking normally with the field and is expected to make a producer in the regular Navarro sand around 3900 feet.

TEXAS GULF COAST

New Miocene sand field indicated on McFaddin Ranch.

★ ★ ★

One Danbury discovery offset flows; another fails.

★ ★ ★

Humble abandons southwest outpost at Friendswood.

Houston.—Shell Petroleum Corporation's McFaddin 1, McFaddin Ranch prospect, S. A. Pace Survey, Jefferson County, indicated it would open a new oil field November 26 when a nine-minute drill stem test of Miocene sands at 5389 to 5408 feet showed 450 feet of pipe line oil, 45 pounds pressure, and no water through quarter-inch chokes. The wildcat will be cored deeper.

Thirty eight feet of oil sand was logged in McFaddin 1 from 5391 to 5434 feet. In the 43-foot section five feet were shale and the balance solid sand showing oil. Prior to this, a sand showing oil was logged from 5328 to 5340 feet. Three drill stem tests of this stratum failed.

Second Well for Danbury

The second commercial oil producer was completed at Danbury last week in Rowen Drilling Company and Shell Petroleum Corporation's Jamison 2, to extend production 660 feet west. It was drilled to 1978 feet in sand showing oil after logging top of the sand at 1964 feet. The well came in flowing 320 barrels of pipe line oil daily through a quarter-inch choke, with a tubing pressure of 210 pounds and a casing pressure of 250 pounds. T. F. Hunter's Blakley Winston 1, northeast offset to the first commercial producer at Danbury, missed the 1960-foot sand last week and was cored to 2065 feet, where it was shut down for orders.

Six thousand feet west of production at Sandy Point, Brazoria County, Henry DeArman's Edmundson 1, D. Tallen Survey, was waiting on cement to set last week after running 167 feet of four-inch liner to 6585 feet. Before setting the liner casing was perforated from 6557 to 6565 feet and the test showed salt water.

Six oil producers were completed at Hastings, Brazoria County. Twelve wells in the field are at completion stages, either flowing into burning pits or waiting on cement to set. The field is the most active field in the Gulf Coast.

Salt Water in Flank Test

A half mile southwest of production at Friendswood, Harris County, Humble Oil & Refining Company abandoned Jones and May 1, Perry and Austin Survey, at 6188 feet after coring salt water sands in Frio formation. Top of the salt water sand was logged at 6166 feet. The company completed a commercial producer at Friendswood in Hicks and Hoidale 1, Perry and Austin Survey. It made 27 barrels per hour through a quarter-inch choke from 6085 feet. Top of the sand was encountered at 5978 feet.

Texas Gulf Production Company will attempt to establish production at Aldine, Harris County. Location for Rath 1 is CE½ Section 34, or approximately 2750 feet south of the north line and 435 feet west of the east line of the M. Sevey Survey.

At Clinton, Harris County, Stanolind Oil & Gas Company will attempt another drill stem test on M. E. Oates 1, Reels and Trobough Survey, at 3823 feet. One made this week failed.

Cores Oil Sand

On the east side of Hardin field, Liberty County Woodley Petroleum cored oil sand at 7583 feet in McMurtry 4 and was taking another core at the end of the week.

Locate Segno Outpost

H. H. Weinart and Republic Production Company announced an outpost location at Segno last week. Whiteside 1 is 330 feet each way out of the northwest corner of a 57-acre tract in the I. & G. N. Survey, Section 13.

Southeast of Livingston, Polk County, Stewart Oil Company made a wildcat location. Galloway 1 is 1800 feet west of the east line and 285 feet north of the south line of the J. W. Ringold Survey.

Northwest of Madisonville, Madison

County, Faucett & Kyle's Cannon Heirs 1, John P. Phillips Survey, showed water last week on a production test. After setting a cement retainer at 1506 feet, casing was perforated with 12 shots from 1470 to 1480 feet and salt water swabbed. A packer was set at 1495 feet and Cannon Heirs 1 flowed water, with a reported rainbow of oil. At the close of the week the crew was preparing to swab again.

In the Cedar Bayou area, Chambers County, Ingot Oil Company and Merit Oil Company were preparing to make another drill stem test on Wright 1, C. Smith Survey. Last week cement was drilled out to 6433 feet and casing was perforated with 12 shots from 6431 to 6433 feet. The well tested dry twice on drill stem tests. The hole was then bailed and it showed some gas.

Texas drilling permits increase

The Texas Railroad Commission this week approved 236 permits for drilling new wells in Texas, 79 more than were allowed the week before.

The only permit granted in the East Texas field was one reported from Smith County. East Central Texas listed 23 new locations.

Operators in West Texas were allowed 51 permits, including 18 in Ector County, while the West Central Texas District reported 23 new locations, including 10 in Shackelford County.

There were 51 permits granted in the Gulf Coast area. Southwest Texas reported 22 new locations.

North Texas operators were allowed 55 permits, including 25 in Wichita and 13 in Young County. The Panhandle District listed only 10 new locations.

TEXAS GULF COAST Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ANAHUAC—		
Humble, Hebert Broussard S-8	672	7085
Johnson 16	336	7175
BIG HILL—		
Stanolind, S. W. Pipkin A-4	*	5459
COTTON LAKE—		
Texas Crusader, Kilgore 9	264	6287
Humble, Howard 2	110	6286
DANBURY—		
Rowan Dr. Co. and Shell, Jamison 2	320	1978
DICKINSON—		
Pure, S. Hutchins A-2	422	8116
FRIENDSWOOD—		
Humble, Hicks and Hoidale 1	648	6065
Jones and May 1	*	6188
HARDIN—		
Shell, Hachey 1	602	7622
HASTINGS—		
Humble, Beers D-4	578	6070
Schindler 3	639	6080
Stanolind, Curkeet B-18	563	6080
Peck 1	562	6092
Roberts 2	701	6079
Surface 6	508	6080
LOCHRIDGE—		
Shell, Ramsey B-2	346	6357
PICKETT RIDGE—		
Texas Crusader, Kubela 3	*	5010
SOUTH HOUSTON—		
Stanolind, Drilling District 18, No. 1	85	4194
SPINDLETOP—		
Stanolind, Fee 28	424	4030
TOMBALL—		
Humble, Blackshear 1	*	5596
Murphy 1	*	5596
TURTLE BAY—		
Stanolind, Silva 5-B	652	6550
WEST COLUMBIA—		
Texas Co., Hogg 88	180	2905

*Failures; †Junked; ¶Million cu. ft. gas.

Field indicated mile off shore in Gulf of Mexico.

★ ★ ★

Quarantine Bay wildcat setting screen to test.

★ ★ ★

South Jennings outpost being rocked with gas.

Lake Charles.—Superior Oil Producing Company's State Gulf of Mexico 1, the first well to be drilled in the Gulf of Mexico along the Texas and Louisiana Gulf Coast, one mile off the shore of Cameron Parish, indicated it would open a new oil field last week when oil sands were cored in Miocene formation at 5110 to 5182 feet. The hole was carried down to 6711 feet in shale. At the end of the week the test was circulating and reaming. Casing will probably be set to protect the hole while drilling deeper.

The offshore wildcat's sands showed a maximum of 10 ohms on an electrical logging device. From 6707 to 6711 feet another sand showed evidence of oil. Side wall samples taken from 5115 to 5185 feet, according to one employee, looked good enough to make a commercial oil producer.

However, around $65,000 was spent for piling and derrick foundation out in the Gulf of Mexico and it is believed the company will explore at greater depths for additional sands.

Another Setting Screen

The second well in the Louisiana Gulf Coast which is attracting attention is Gulf Oil Corporation's State Quarantine Bay QQ-3, Section 17-19s-17e, Plaquemines Parish. The crew is setting screen to test sands from 8134 to 8177 feet. Last week the wildcat was cored from 8144 to 8202 feet, recovering additional oil sands. A string of 9⅝-inch casing was cemented at 8143 feet after a drill stem test at 8127 to 8143 feet showed 1500 feet of 34.3 gravity oil. Cores from 8149 to 8153 feet recovered oil sands which showed four ohms and 70 milivolts on an electrical logging device. A core from 8155 to 8157 feet showed more oil sands while a core from 8157 to 8162 feet revealed five feet of sand showing oil. From 8166 to 8174 feet, eight feet of sand showing oil was logged which showed three ohms and 67 milivolts on an electrical logging device. From 8197 to 8202 feet sandy shale with an oil show was encountered.

Republic Production Company's Sabine Tram 1, five miles west of Starks, Section 25-8s-14w, Caicasieu Parish, created considerable excitement last week when a report was circulated that the well was blowing wild. However, this report was not confirmed. The last report was that the drill stem was stuck at 9620 feet. The wildcat has cored several gas sands.

Logs Sand and Continues Drilling

In Jefferson Davis Parish and east of Woodlawn, Section 12-9s-8w, Union Sulphur Company will drill Calcasieu National Bank 1 to contract depth before plugging back and testing sands which have shown oil. At the end of the week the well was coring shale at 8315 feet. An electrical logging device showed 25 ohms from 8293 to 8298 feet. Sands cored from 8022 to 8139 feet also showed evidence of oil.

Southeast of production at Roanoke, Jefferson Davis Parish, Superior Oil Producing Company logged salt water sands in Ferguson 1, Section 13-9s-4w, at 6825 to 6843 feet. Drilling continues.

Loffland Brother's Fontenot 1, outpost test at South Jennings, Section 16-10s-3e, Jefferson Davis Parish, was being rocked with gas last week. Fontenot 1 perforated casing with 17 shots from 8870 to 8875 feet and a six-minute drill stem test showed 2790 feet of gas-cut mud and distillate, no salt water, and a 45-pound pressure through quarter-inch chokes. Another drill stem test of the same sand showed 20 stands of distillate, 10 stands of gas-cut mud, and three stands of salt water in 11 minutes through quarter-inch chokes.

SOUTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
BLACK BAYOU—		
Shell, Watkins 36	638	5053
GILLIS—		
Union Sulphur, Kauffman 7	*	7057
JENNINGS—		
Superior, Leckelt 8	148	6919
Moresi 3	535	6844
NEW IBERIA—		
Canal Oil Co., Bernard 11	*	3984
William Helis, Schwing 3	*	5509
LIRETTE—		
United Gas, Fee 1	*	lcn.
POTASH—		
Humble, Orleans Levee Board 14	*	997
WEST HACKBERRY—		
Stanolind, Duhon 7	71	3696
ACADIA PARISH—		
J. G. Markley, Daigle Farms 1, Churchpoint prospect, 19-7s-2e	*	8506
CALCASIEU PARISH—		
Union Sulphur, Bell 1, s of Sulphur, 10-10s-10w	*	8473

*Failures; †Junked; ¶Million cu. ft. gas.

North of production at Lake Long, Lafourche Parish, Fohs Oil Company and Pilgrim Exploration Company's State Lake Long 3, Section 77-17s-19e, was preparing to side track at 9481 feet after a drill stem test of broken formations from 9495 to 9537 feet showed salt water. Coring continues.

William Helis cored over 1691 feet of salt in City of New Orleans 2, Marchand prospect, Section 19-23s-23e. Last week the wildcat was down to 9650 feet in salt, having logged top of the formation at 7959 feet.

Two wildcats were abandoned in the Louisiana Gulf Coast last week: J. G. Markley et al's Daigle Farms Company 1, Churchpoint prospect, Section 19-7s-2e, Acadia Parish, was drilled to 8506 feet; south of Sulphur, Union Sulphur Company's J. A. Bell 1, Section 10-10s-10w, Calcasieu Parish, was drilled to 8473 feet in shale. Fresh water sands were logged in this wildcat from 7828 to 7833 feet.

Location at 10,000-foot test staked in Zwolle

Shreveport.—Sutton Oil Company of Lake Charles last week staked location for a proposed 10,000-foot test in the old west Zwolle (Blue Lake) field, Sabine Parish, on the block of acreage secured from Charles H. Lawrence, recently assembled around Section 14-7n-14w (The Oil Weekly, Nov. 1, 1937). The new location, Sabine Lumber Company 1, SE NW NE 23-7n-14w, was recommended by H. D. Easton, geologist who mapped the Zwolle shallow field and made locations for the discovery wells.

Continental Oil Company, which recently leased 85,000 acres from the Singer Sewing Machine Company in Madison Parish, northeast Louisiana, is reported obligated to drill three tests on 10,000-acre tracts to be selected from the entire block and will drill the first of the three in Section 34-17n-12e, near Tallulah.

The California Company, whose geophysical parties recently completed considerable shooting in Concordia and Tensas parishes, and which recently secured a six-months geophysical option on 125,000 acres of Tensas Delta Lumber Company acreage in LaSalle, Catahoula and Caldwell parishes, has the option of selecting as many drilling sites as it chooses on 10,000-acre blocks, but must drill at least 4500 feet on each block selected, and to hold the leases must drill a test within 90 days of completion of the previous one.

In Bienville Parish between the Bear Creek and Driscoll gas-distillate fields, Turman Oil Company has been taking some leases in Township 16 north, Ranges 5 and 6 west.

NORTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CADDO PARISH (Rodessa)—		
R. G. Trippett, Davis 2, 3-23n-16w	350	5973
CLAIBORNE PARISH (Lisbon)—		
Crescent Drilling Co. et al, J. B. Fowler 1, 33-21n-4w	650	5288

*Failures; †Junked; ¶Million cu. ft. gas.

Lisbon's basal Glen Rose gets eastern extension

Shreveport.—The producing limits of Libson basal Glen Rose lime oil producing area were extended three-fourths of a mile east last week by Crescent Drilling Company and associates' J. B. Fowler 1, C N½ SE NW 33-21n-4w, Claiborne Parish, completed after acidizing at 5288 feet flowing 40 barrels of oil per hour through three-quarter inch tubing choke. Elevation was 295 feet. The poor porosity in this well had raised doubts as to whether it would produce or not.

A. O. Olsen and associates' Sharpe 1, C W½ NW 15-18n-16w, Caddo Parish, showed only mud in a drill stem test last week at 5609 feet, and operators were arranging to core deeper ahead.

Gulf Oil Corporation continued efforts to kill a heavy salt water flow at 5691 feet in Goodpine Oil Company 1, C SE SW 25-14n-8w, Bienville Parish wildcat. The water is coming from 5638 feet. When the flow is killed a drill stem test will be made at 5691 feet, where a showing of gas was encountered.

H. L. Hunt and Seaboard's Federal Land Bank 1, C SW 10-16n-6w, Bienville Parish, one mile south of the two gas-distillate producers at Bear Creek, after showing only one-half million feet of gas when casing was perforated at 6848-58 feet, is drilling below 7050 feet.

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ARKANSAS FIELDS

Leasing continues active in Union and Columbia counties.

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Fourteen active drilling wells in Schuler field.

El Dorado, Ark.—Benedum & Trees Oil Company, which has a 5,000-acre block centering around Section 16-14-19, Ouachita County, Arkanas, is planning to make location immediately for a test to the Permian lime, which horizon has recently been found productive in the Schuler field, Union County, and in Columbia County near Buckner, the latter a wildcat area.

The leasing "play" that is under way in Union County as a result of Schuler developments is largely confined at present toward the east of this field which centers in Section 18-17-18. Shell Petroleum Corporation continues to add to its holdings around Sections 18, 19, 20 and 21-18-16, Union County, and Tidewater Associated Oil Company has joined in the leasing campaign in that direction, extending into township 18, range 15.

Leasing continues very active in Columbia County, recent purchasers in that county including Standard Oil Company of Louisiana, Magnolia Petroleum Company, Lion Oil Refining Company, Devonian Oil Company, Maracaibo Oil Company, Hunt Oil Company, Root Petroleum Company, Mid-Continent Petroleum Corporation, and a number of individuals. Just across the LaFayette County line Magnolia Petroleum Company is leasing around Section 14-16-23.

Three-fourths of a mile east and slightly south of its Permian lime discovery oil well in Section 8-16-22, Columbia County, Standard Oil Company of Louisiana leased 95 acres in Section 17-16-22, for slightly more than $400 per acre cash and an equal amount from production.

Standard Oil Company plugged back its Permian discovery well, J. P. McKean 1, SW SW 8-16-22, from 7309 feet where it had gone into the salt water level at 7280 feet, and recompleted it at 7258 feet, flowing 456 barrels of oil in 24 hours through open tubing, tubing pressure 30 pounds and casing pressure 240 pounds. Later the well was treated with 2000 gallons of acid and averaged 44 barrels per hour for the first 6½ hours through open tubing, tubing pressure being 250 pounds and casing pressure, 360 pounds.

Tidewater Associated Oil Company's and Seaboard's C. N. Crumpler 1, C SW NE SW 24-17-19, had a fishing job last week after losing 70 stands of pipe at 7568 feet and fear is expressed that this hole may be lost. In the same county, Kerrlyn Oil Company's Barnett 1, SE SW NE 14-17-20, was coring below 6075 feet after coring a salt water sand at 6061 feet; elevation is 321 feet. E. O. Olds and associates were shut down at 4513 feet. contract depth, at Mary Dennis 1, NW SE SW 4-17-21, but it may be deepened to Permian lime.

Schuler Active

Fourteen wells in the Schuler field are drilling for the 2 producing horizons in that field below 7500 feet and 4 other operations designed for the same horizons are moving in materials or are rigging.

In recent weeks both the lower Marine horizon and the Permian lime below 7500 feet have been found productive in that field which had seen 13 wells completed in 5 lenses from 5550 to 5900 feet.

Alice Sidney Oil Company is preparing to test the Permian lime in D. S. Morgan 2, SE NE SE 18-18-17, in which 5-inch casing was cemented at 7575 feet with total depth of 7700 feet. The Permian lime was topped at 7635 feet; elevation is 223 feet. The "Jones" sand of the lower Marine was logged from 7519 to 7599 feet.

Edwin M. Jones is coring at 7800 feet in Marine Oil Company 2, SW NW SE 17-18-17, which topped the Permian lime at 7680 feet where some salt water appeared; elevation is 254 feet. This test logged dense lime and oolitic lime with an odor of sulphur from 7707 to 7795 feet, with no saturation to indicate a producer so far. Jones has a fishing job at 7029 feet in Marine Oil Company 4, SE SW SE 17-18-17.

Phillips Petroleum Company's Ed Gan 1, SW SE NE 18-18-17, with elevation of 232 feet, logged "Jones" sand from 7530 to 7604 feet and topped Permian lime at 7638 feet, logging saturated lime from 7646 to 7656 feet and is arranging to set 5-inch casing; total depth is 7700 feet.

ARKANSAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
CALHOUN COUNTY—		
Hayner et al, Brandon 1, 34-11-13..	*	3503
MILLER COUNTY (Rodessa)—		
Hunt Oil Co., Womack 5, 10-20-28	385	6064
Layton Oil Co., E. S. Terry Est. 3, 14-20-28	1500	6096
W. L. McClanahan, T. J. Hopkins 1, 11-20-28	700	6150
Skelly, W. M. Thomas 1, 12-20-28.	700	6140

*Failures; †Junked; ¶Million cu. ft. gas.

El Dorado, Ark.—Two drilling permits were authorized last week by the Arkansas Board of Conservation as follows: Nevada County—Benedum and Trees Oil Company, Mary Jackson 2300 feet south and west NEc NE NE 9-14-20; Ouachita County—O. F. Whittaker, C. C. Guttrey, 2200 feet north of south line and 160 feet east of west line SE NW 21-15-19.

Bartlesville.—Phillips Petroleum Company has announced a retirement income plan, to be extended to all employees. The plan becomes effective January 1, 1938, and is to be financed jointly by company and employees. Retroactive contributions will be made for each employee by the company up to the first of the year. The plan is voluntary, and depends upon acceptance by 75 percent of the employees. Retirement age has been set at 65 for men and 60 for women.

SOUTHEASTERN STATES

Alabama's deepest test abandoned at 7520 feet

Jackson, Miss.—Setting a depth record for Alabama, Joe Modisett and associates' McCorvey 1, SW SW 20-9n-2w, Choctaw County, Alabama, was abandoned last week at 7520 feet in red beds. The test was on the Hatchetigbee Anticline and had several showings of gas in the Selma chalk logged at 1865 feet; elevation was 120 feet. Other contact points on this test, in which an electrical logging device was run before abandonment, include: top of the Eutaw 2913 feet; top of the Tuscaloosa 3525 feet, top of upper Cretaceous marine formation 4100 ft, and top of the paleozoics 6650 feet.

Several companies had spreads around this test. The hole will be left unplugged so it can be deepened.

A wildcat in south Mississippi was also abandoned last week in Fred E. Courson and associates' Homochitto Lumber Company 2, Section 18-5n-3e, Franklin County, drilled to 5011 feet; elevation was 320 feet. Cockfield was logged at 2753 feet and the Minden formation at 3205 feet.

Two wildcat locations were announced in Mississippi, both in Hinds County, as follows: Black River Oil Company's Federal Land Bank 1, 620 feet west and 300 feet south NEc 11-15n-5w, and Cleve Love and associates' S. F. Johnson 1, 1320 feet south and 660 feet west NEc SE 29-6n-1w. The former will be a 6000 foot test, and the latter may also be a deep test.

SOUTHEASTERN STATES Completions

ALABAMA

Company, Well and Location	Init. Prod. Bbls.	Depth
CHOCTAW COUNTY—		
Joe Modisett et al, McCorvey 1, 20-9n-2w	*	7520

MISSISSIPPI

FRANKLIN COUNTY—		
Fred E. Courson et al, Homochitto Lbr. Co. 2, 18-5n-3e	*	5011

*Failures; †Junked; ¶Million cu. ft. gas.

NEW MEXICO

Cooper extension indicates link with Lynn field.

★ ★ ★

Lynn is broadened one location to east.

★ ★ ★

Ready to gauge recent Vacuum area discovery.

Hobbs, N.M.—Development of the north portion of the Cooper field, Lea County, has been revived by the recent extension of the oil area more than half mile to the northwest on a direct strike towards the Lynn pool. Both are flanked on the east by dry gas production, and the 2½-mile interval separating the two oil areas is prospective oil territory, although comparatively narrow in width. Three gassers immediately east of this interval establish a continuous structure.

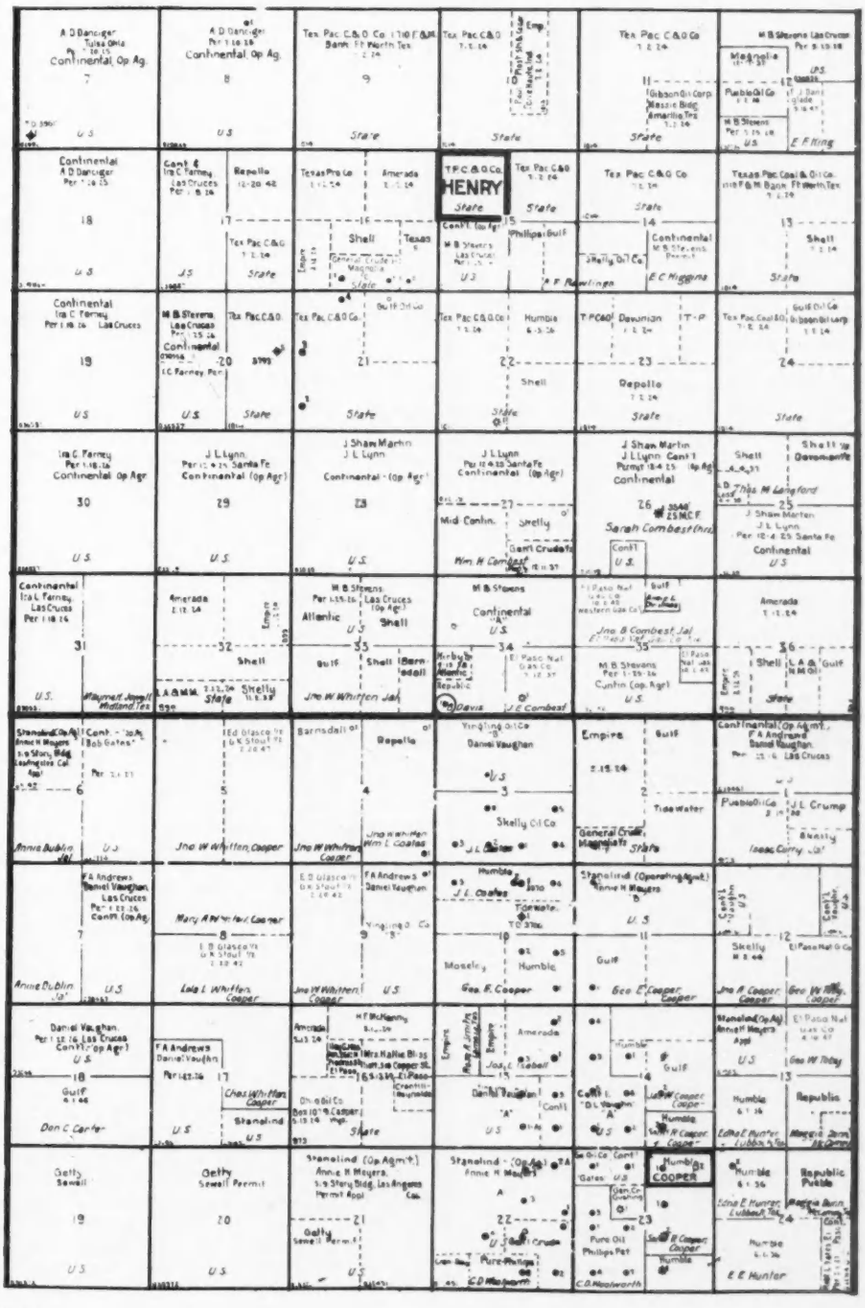
Oil producing limits of the older section of the Lynn pool were broadened one location to the east when The Texas Company's State 2-B, SW SE SE 16-23s-36e, flowed 66 barrels oil per hour natural through 1½-inch choke on 7-inch casing, with drill pipe in the hole from lime at 3665-3700 feet. It has a ground elevation of 3423 feet. This well later flowed 95 barrels oil in one hour and 35 minutes while running tubing to complete. It is an east offset to a big producer scored by General Crude Oil Company and Magnolia Petroleum Company's State 2-C last October.

Eventual linking of the Cooper and Lynn oil areas won support when Republic Production Company's B. Davis 1, SW SW SW 34-23s-36e, flowed 112 barrels hourly natural through 1-inch choke from lime at 3572-3621 feet, with an elevation of 3409 feet. Gas volume was rated at 3,000,000 feet daily. Repollo Oil Company C. W. Whitten 2, NE NE NE 4-24s-36e, has been authorized as a southwest diagonal offset, and Kan-Mex Corporation is scheduled to drill a south offset. Continental Oil Company et al's Stevens 1-A-34, located half mile north of the Cooper field extension, showed water on drill stem test at 3616-91 feet, with an elevation of 3417 feet, and plugged back to 3600 feet to complete as a gasser. Small amount of oil appeared when formation tester was used at higher levels. Barnsdall Oil Company's J. W. Whitten 1, NE NE NW 4-24s-36e, has started operations, and is attempting to widen the north end of the Cooper field more than half mile to the west.

Skelly Oil Company's W. H. Combest 1, NW NW SE 27-23s-36e, about 1½ miles north and half mile east of Republic Production Company's prolific well, is apparently east of the oil belt, and tested dry after using acid at 3636 feet, or 236 feet sub-sea. It is coring at 3665 feet, with bottom-hole water due near this level.

Vacuum Extension

Completion gauge was due late last week for The Texas Company's State 1-L, C SW NE 1-18s-34e, situated 3¼ miles south of nearest production in the Vacuum pool, after flowing 205 barrels oil natural in 6 hours through casing from lime at 4297-4497 feet. It has an elevation of 3998 feet. Tubing has been landed to make an official test. This well was drilled in with cable tools. The production is transported by tank trucks to the Hobbs field,



Revival of drilling in the north portion of the Cooper field, Lea County, has followed the recent completion of a prolific natural oil well by Republic Production Company's B. Davis 1, indicated by circle. Linking of this area with the Lynn (Henry) pool has been accomplished by gassers on the east flank, and oil production will likely be found immediately west of the gas belt. (Map by Zingery Oil Map Company, Fort Worth.)

where deliveries are made to Shell Pipe Line Corporation. Performance of this well reveals that the Vacuum pool affords a large producing area, and due to state permit requirements may experience an active drilling program next year. Skelly Oil Company's State 1-J, C NE NW 31-17s-35e, about 1½ miles northeast of the above well, has cemented surface pipe at 143 feet, and if productive will force a series of progressive offsets. Magnolia Petroleum Company's State-Bridges 3, south outpost for the discovery block, halted work at 528 feet to re-set 13½-inch surface string.

Operations in Lea County continue on a reduced basis. Only 6 new tests were authorized the past week, including 3 for the Eunice field. Shell Petroleum Corporation awarded contracts for the drilling of State 4-J, SE SE SE 32-20s-37e, and State 2-L, NE SE SE 1-21s-35e, while L. E. Elliott et al's Elliott permit 1, NE NE SE 26-20s-36e, is on the west edge. Offset requirements resulted in Atlantic Refining Company making its first entry into the Penrose field, and operations have been started on Grizzell 1, C SE NE 6-22s-37e.

Two Lea County wildcats were eliminated the past week through the appearance of sulphur water in the big lime. J. C. Maxwell, R. Crandall and C. H. Osmond's Maxwell 1, C SE SE 2-11s-36e, Ranger Lake area, encountered sulphur water at 5274-77 feet, with an elevation of 4044 feet, and was abandoned at 5301 feet. Humble Oil & Refining Company's Saunders 2, C NW NW 9-22s-34e, suspended operations in water formation at 4237-65 feet, with an elevation of 3598 feet. Jas. A. Mascho et al's Cloyd-Conoco 1, C SE SE 20-22s-33e, projected Delaware test, shut down at 3523 feet to run pipe to exclude water from above.

NEW MEXICO
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
EDDY COUNTY—		
Weiner & McDowell, Kerr 1, c se nw 3-24s-29e	*	3152
Western Gas Co., Cagle 1, c nw nw 8-26s-30e	*	3638
LEA COUNTY (Cooper)—		
Republic Prod. Co., B. Davis 1, sw sw sw 34-23s-36e	3000	3621
LEA COUNTY (Eunice) —		
Skelly Oil Co., State 2-H, c e½ nw nw 25-20s-36e	2000	3850
LEA COUNTY (Langlie)—		
Culbertson & Irwin, Inc., J. B. Humphrey 3-A, ne sw ne 3-25s-37e	500	3433
LEA COUNTY (Lynn)—		
The Texas Co., State 2-B, sw se se 16-23s-36e	2000	3700
LEA COUNTY (Mattix)—		
Repollo Oil Co., Lee Carter 1, sw se ne 9-24s-37e	90	3787
LEA COUNTY (Monument)—		
Continental Oil Co. et al, Sanderson 5-A-14, ne ne nw 14-20s-36e	2500	3873
Gulf Oil Corp., Shipp 1-B, c nw sw 8-19s-37e	250	4040
LEA COUNTY (Penrose)—		
Bradley et al, E. N. Grizzell 1, c sw ne 5-22s-37e	500	3737
LEA COUNTY (Vacuum)—		
The Texas Co., State 1-L, c sw ne 1-18s-34e	820	4497
LEA COUNTY (Wildcat)—		
R. Crandall, C. H. Osmond & J. C. Maxwell, Maxwell 1, c se se 2-11s-36e	*	5301

*Failures; †Junked; ¶Million cu. ft. gas.

ROCKY MOUNTAIN FIELDS

Lance Creek completing first double-sand producer.

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Watch test that may double East Lance Creek size.

Casper, Wyo.—Ohio Oil Company is using an interesting method in completing Converse Sheep Company 5, SE SW 32-36n-65w, Lance Creek well in Niobrara County, from two deep horizons separated by more than 700 feet.

The well drilled in 1936 as the original "mystery" test in Lance Creek, stopping at 4451 feet and testing, results of which have never been disclosed. It then plugged back to 3702-3762 feet in the Sundance and completed for 1620 barrels daily. Last week Ohio drilled plugs to the Middle Minnelusa and is preparing to complete in both sands. A 6-inch liner has been run to bottom from casing point of the 7-inch string (set at 3637 feet) to 4396 feet (top of the Middle Minnelusa sand). Tubing has been run to bottom with a disc set in the tubing at a point just below the basal Sundance, while a packer has been set around the tubing in the liner immediately below the Sundance. Tubing is unscrewed just above the packing point and suspended at the Sundance level. Through this tubing operators are circulating water and oil to clean out the mud and recomplete in the Sundance.

To Produce Through Annular Space

When the well has been brought back to production in the Sundance formation, tubing will be connected to the lower string, disc drilled in the lower joints of tubing, and the lower formation cleaned out and brought in through the tubing string. The Sundance at the same time will be produced through the annular space between the tubing and 7-inch casing string. The well will be the first Lance Creek test to complete in both horizons. Other Minnelusa wells heretofore have developed water in the Sundance. Ohio brought in the discovery well in the Minnelusa, Leo 5 OPC 16, on the east side of the field, last June.

Again reaching a critical level, Continental Oil Company's Leach 1, SW NE NE 29-36n-64w, test of the East Lance Creek unit block, is being keenly watched. Coring at 6200 feet, the well is feeling for the Basal Minnelusa (Pennsylvanian) sand just above the Madison lime. Argo Oil Corporation's Ford 4, SW SE 33-36n-65w, a recent Minnelusa completion, on the northwestern side of the field, drilled to 5957 feet encountering the sand at the bottom of the hole. Cores showed good oil saturation, but a tight-textured sand, and the well failed to yield commercial results in testing at this level, and plugged back to the Middle Minnelusa for a small completion. Operators are hoping that the third sand will prove soft at the Leach location. Continental has not released any information as to sand record or core recoveries in Upper Minnelusa sands or in the Basal Sundance sands. If commercial production is developed in the East Lance Creek test, it will more than double the area of the field.

South Baggs Test Fails

Superior Oil Company's test of South Baggs structure, Carbon County, Wyoming, near the Colorado-Wyoming state line, and in the Cherokee Ridge Uplift area, failed this week. The test, Christiansen 1, W NW 7-12n-92w, is abandoning at 2080 feet after going out of the Wasatch beds at 1450 feet. It was in the Wasatch beds that the Mountain Fuel Supply Company a year ago discovered the first large commercial oil production in rocks of the Tertiary Age in the Rocky Mountain region. Discovery was made on the Powder Wash structure in the same general area as Baggs. A test of the North Baggs structure is contemplated. At Middle Baggs, the Red Feather Oil Company in 1929 developed 5,000,000 cubic feet of gas daily in Upper Wasatch beds. This test, located in SE 35-13n-92w, abandoned at 2300 feet after running into mechanical difficulties.

Following failure of its deep test of Muskrat to develop production in formations down to the Madison lime, the Sinclair-Wyoming Oil Company plugged back Muskrat 2-C well for a 24,000,000 cubic foot gasser, and has

MOUNTAIN STATES
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
MONTANA		
CARBON COUNTY (Dry Creek Field)—		
Ohio Oil Co., Kent 1, se se 4-8s-2e	¶2	5976
TOOLE COUNTY (Kevin-Sunburst Field)—		
Vander Pass & Montgomery, Thumm 1, nw sw nw 33-35n-3w	200	1710
"56" Petroleum Co., Davidson 2, se nw sw 26-35n-4w	75	2860
WYOMING		
FREMONT COUNTY (Muskrat Field)—		
Sinclair-Wyoming Oil Co., Muskrat 2-C, sw sw 1-33n-92w	¶24	8112
CONVERSE COUNTY (Lance Creek Field)—		
Continental Oil Co., Schuricht 5-B, csw sw 5-35n-65w	516	5273

*Failures; †Junked; ¶Million cu. ft. gas.

spotted location for a second deep test, Muskrat 2-B, CNW NE 4-33n-92w, a 7000-foot project. Three tests have been drilled on the three fault blocks on the Muskrat structure. The Producers & Refiners Corporation completed the discovery in 1928 in NW SE SE 34-34n-92w, for 75,000,000 cubic feet of gas daily at 4340 feet in the Frontier. A failure was drilled in the NW SE NW 33-34n-92w, stopping at 4810 feet after testing dry in the Frontier. The latter well was on the west fault block.

Cherokee Ridge Wildcat Stops

Marking another important wildcat failure in the southwestern Wyoming area, the Mountain Fuel Supply Company's Williams 1, CE½ NE 5-12n-95w, Cherokee Ridge, abandoned at 5680 feet. The well encountered no oil or gas shows after passing through shallow gas showings above 600 feet.

Place Oil Company's Government 1, SE SE SE 9-26n-113w, southeast extension test to the LaBarge field, southwestern Wyoming, resumed drilling this week at 1250 feet after several weeks shut down. The well has had several oil and gas shows and points to a possible extension of the LaBarge light oil field.

Resolute Oil Company's Government 1, CNE NE 20-57n-101w, third deep well on the Badger Basin structure, Park County, northern Wyoming, is drilling at 8669 feet to test the lower sands in the Frontier series and possibly drill to the Dakota formation. It failed to respond satisfactorily on a swabbing test through tubing after shots were placed in the First Frontier at 8385-8628 feet. Five hundred quarts of nitroglycerine were used. Badger Basin is the deepest producing field in the Rocky Mountain region.

Michigan output of gas at high peak

Mt. Pleasant.—Reporting production of dry and casinghead gas during the first nine months of this year to be 6,514,902,000 cubic feet, the Michigan state conservation department states 1937 will establish a new record. The nine-month's production is only 349,824,000 cubic feet short of the 6,864,726,000 cubic feet for all of last year, indicating that mark will be passed when October figures are in.

F. R. Frye, petroleum engineer in the state geologist's office, attributes increased production to development of existing wells and an increase in clients. No important new fields have been discovered this year.

Six brine disposal charges in Michigan

Action was taken this week by the State Stream Control commission against six oil companies charged with violating orders of the commission to properly dispose of brine from certain oil wells.

It marked the first action under the 1937 act of the legislature in which companies disobeying orders of the theretofore almost powerless commission are liable to fines from $25 to $100 per day for each day an order is disregarded.

Action was filed against Nollem Oil & Gas Company, Mammoth Producing & Refining Corporation, ABT Oil Company, Swanson Consolidated Oil Company, and Duck Lake Oil Company, all charged with failure to take proper steps to dispose of brine.

MICHIGAN

Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ALLEGAN COUNTY—		
Ross & Vale, Bredewig 1, nw sw sw 15-4n-13w	40	1488
Lentz & Miller, Newell 3, se ne sw 16-4n-13w	100	1600
Muskegon Oil Corp., Seabright 2, se se ne 21-4n-13w	150	1595
ARENAC COUNTY—		
Hal-Be-Oyle, Peavy 3, sw sw se 4-20n-4e	75	2595
Mich. Devonian, Peavy 3, sw nw se 4-20n-4e	200	2602
Great Western Pet. Co., Dobler 1, nw nw sw 10-20n-4e	50	2614
Weber Oil Co., Whiting 5, nw ne ne 10-20n-4e	10	2580
GLADWIN COUNTY—		
Mammoth P&R., Wood 2, ne ne se 4-18n-1w	60	3666
Sun, Rabb 8, se ne ne 10-18n-1w	165	3660
Rabb 11, nw sw ne 10-18n-1w	1540	3657
Rex O&G Co., Woodring 2, sw sw se 23-18n-1w	100	3691
R. F. Vorhees, Beuhler 1, se sw ne 26-18n-1w	450	3574
Gordon Oil Co., State D-1, se ne nw 35-18n-1w	300	3580
State C-3, ne nw se 36-18n-1w	25	3581
Whitehill, Clovis & Drury, Bosley 1, ne se se 11-19n-1e	96	3449
GRATIOT COUNTY—		
Red-Man Oil Co., Creaser 1, ne sw se 18-11n-2w	•	3284
ISABELLA COUNTY—		
Pure, McClintic B6, se nw sw 32-15n-6w	40	3638
OGEMAW COUNTY—		
United Driller, Kyler 2, ne se ne 19-22n-2e	110	2730

*Failures; †Junked; ¶Million cu. ft. gas.

MICHIGAN FIELDS

Will acidize two Michigan wildcats

Mt. Pleasant, Mich.—Two outpost tests of the Dundee limestone horizon, each showing oil and gas, are shut down for acidizing, with natural showings important enough to bring considerable lease and royalty dealings.

McClanahan Oil Company's Reua 1, Section 11-17n-1e, Billings township, Gladwin County, two miles east of producing Dundee wells and four miles northwest of the new play in Bentley township (17n-2e), showed saturation 90 feet in the lime. Dundee was logged at 3,469 feet and drilling halted at 208 feet. Five-inch casing will be set at the Dundee seat and the test acidized.

Sun Oil Company's State B1, Section 5-16n-1w, Edenville township, Midland County, four miles southeast of the small South Beaverton pool, will be acidized at 3,955 feet or 154 feet in the lime.

Of 18 completions in Michigan this week, 17 were commercial oil producers. The lone failure was recorded in Gratiot County, where Red-Man Oil Company's Creaser 1, Section 18-11n-2w, a wildcat test, went into water in the Dundee at 3,284 feet.

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SHREVEPORT LOUISIANA
PELCO
Lake Charles—Houma—Converse
New Iberia—Rodessa—Monroe
Cotton Valley—Turnertown
Greggton—Houston

EASTERN FIELDS

Centralia awarded place in list of Illinois fields.

* * *

Three important wildcats in Coal Basin appear dry.

Olney, Ill.—Another new field was added to the rapidly growing list in this state during the week when Adams Oil & Gas Company's L. Schmitz 1, 2½ miles northwest of Centralia in Clinton County, opened a new Benoist sand field when 26 feet of pay, bottomed at 1330 feet, indicated a pumping initial of 150 barrels per day.

Sand in the new strike, located 15 miles south of Patoka field in Marion County, was found about 100 feet higher than it is found in Patoka.

Success in the Centralia strike was offset by disappointing developments in three important wildcats in Illinois. Gulf Oil Corporation's Lawton 1 appears a failure at 3245 feet. This wildcat, located in NW NE NW 29-4n-8e, was given two 40-quart shots of nitroglycerine, one in the St. Louis sand and the other in the McClosky. Both failed to produce commercial oil. A second disappointment was afforded by Benedum-Trees Oil Company's Earl Craig 1, SE SW 28-2n-7e, which looks like it may make only a small gas well in St. Louis lime at 3280 feet after going through the McClosky without important showings. This well is one of three drilled by the company using rotary tools and a coal-fired 100-horsepower boiler. A third disappointment was recorded by Kingwood Oil Company in Bartels 1, CW½ NW NE 26-6n-5e, Mason Township, Effingham County, which found the upper sands, including McClosky, dry, and no production in Devonian. Stopping drilling at 4250 feet, it constituted the deepest test in the Illinois Coal Basin.

Vermillion Oil Company's C. D. Duff 1, Section 19-4n-8e, Clay Township, Clay County, heralded a week ago as bringing Clay City into the Illinois oil picture, swabbed salt and sulphur water November 23 which dampened enthusiasm raised a week ago when an excellent McClosky sand was cored. Operators have not given up hope, however, and are still trying to make it an oil well.

Johnson & Cozart's Poorman 1, Section 5-4s-8e, Mill Shoals Township, the only active test in White County, found oil showings in the St. Genevieve formation between 3300-3314 feet and is casing to that level for a production test. Saturation was previously encountered between 3280 and 3288 feet.

Failure of several Patoka area tests to obtain production last week threw a pallor of gloom over that Marion County area. Alexander et al's Allison 3, Section 33-4n-1e, had an oil flow, but heavy salt water may cause abandonment; Patoka Petroleum Corporation's Vernon DuComb 1 brought in salt water; Adams Gas & Oil Company's Artie Rogers 1 was a dry hole; Coast Products Company got a duster on the Calvin Belcher farm; and Bob Lincoln drilled a dry hole on the Crawford farm and a duster on the Richardson farm.

New York-Pennsylvania

Three completions were reported from the New York-Pennsylvania deep sand gas fields, one of which was the twelfth successful completion in the recently opened Woodhull Township field of Steuben County, New York. Drilled by Godfrey L. Cabot, Inc., it is on the C. Groves farm. It topped the Oriskany at 4166 feet and encountered a flow of gas two feet in that formation. Completed at 4186 feet, it had an initial open flow of 3,500,000 cubic feet a day, with a rock pressure of 1680 pounds.

The same operator completed a 6,000,000 cubic foot gasser on the R. Johnson farm, Bingham Township, Potter County, on the Pennsylvania side of the field. It topped the Oriskany at 5227 feet, was completed at 5245 feet and had an initial rock pressure of 915 pounds.

Two new tests will be drilling shortly in Allegheny County, Pennsylvania. Empire Producing Company is moving in material on the Della Mulvey farm, Alma Township, while Southwestern Development Company has rig up on the Johnson Estate farm, Willing Township. Elevations are 2077 feet and 2015 feet, respectively.

Pennsylvania's pollution law discussed by operators

The application of Pennsylvania's drastic water pollution law enacted by the last legislature to producers and refiners was described by Christian L. Seibert, engineer of the state sanitary water board, before a meeting called in Oil City by the Department of Manufacture, National Petroleum Association.

The act was described by Seibert as the most drastic on the subject ever enacted by a state, expressing little doubt but that the courts will uphold it in view of the spirit of the act in its all-inclusive definition of pollution.

Companies and individuals affected by the act, he said, must file reports with the state sanitary water board by December 1. Pointing out that the best methods of water purification eliminate only 85 percent of pollution, the speaker said the board will not be too drastic in its requirements unless the stream into which the waste is emptied is too small to accommodate it.

Refiners, Seibert said, have shown more inclination to eliminate pollution than producers. Principal problems of the producer are small oil losses and salt water which in themselves, are not individually serious but in aggregate represent a condition that must be corrected. He said he could not offer a solution to disposition of salt water by means other than evaporation.

Disposition of waste oil, caustic wash water, acid sludge, emulsions and fuller's earth were listed as problems of the refiner, and the speaker suggested common treatment plants for acid sludge and cess pools or lagooning for caustic wash water.

Seibert said his activity in enforcement of the act was that of an intermediary between industry and the law to aid, rather than to enforce, compliance. He warned, however, that it may be necessary to make examples of some who make no effort to comply. In enforcement the state board will direct its attention to individuals and firms making no effort to comply, rather than those who are attempting to meet the law's requirements.

The act specifies that all plans and designs for construction of waste treatment units must be submitted to the board for approval before construction is started.

Not estimate gas reserves of Michigan

No estimate of Michigan's natural gas reserve will be made by a state fact-finding committee appointed to determine the state's natural gas resources, C. A. Winder, chief engineer for the state public utilities commission and chairman of the committee, announced last week. Rather than attempt to set a figure representing the reserve, the committee will attempt to evolve some plan through which "all interests in the natural gas industry might work together for a common goal—to get the utmost gas from that reserve," Winder said.

In hearings before the committee, gas experts have submitted widely varying estimates on the state's gas supplies. Some said the state's entire reserve will be exhausted within five years, while other claimed the reserves were unlimited. "If experts who have spent a lifetime estimating gas reserves are unable to agree, how could this committee be expected to determine how much gas actually is in the ground?" Winder asked.

"To some members of the committee it seems that a lack of coordination of effort among the land owner, the driller, the pipe line company and the distributor is the principal problem before Michigan rather than a lack of gas," Winder declared. "We need a coordination of effort, and the committee will attempt to tell how this might be achieved."

The committee's report may be completed in January, he said. Members, besides Winder, are Prof. S. G. Berquist, of Michigan State College; George B. Garner, of Six Lakes, representing land owners; Roy F. Ide, of Detroit, representing independent producers, and William Thomas, of Mt. Pleasant, representing the Oil & Gas Association of Michigan.

EASTERN FIELDS
Completions

ILLINOIS

Company, Well and Location	Init. Prod. Bbls.	Depth
CLAY COUNTY—		
Duncan Oil Company, Carroll 1	700	2995
Gordon Oil Company, Carroll 2	358	3038
Pure Oil Co., Scrugham 2	213	3009
Wilkin 6	60	2970
CLINTON COUNTY—		
Santa Fe Oil & Gas Co., Kohrmann 2	120	995
Wise & Goldschmidt, J. Schuchmann 1	*	1521
FAYETTE COUNTY—		
Oil Development Co., Vance 1	*	2064
JASPER COUNTY—		
W. R. Anderson et al, Hetzer 1	*	3205
McDONOUGH COUNTY—		
Measley et al, Collins 1	2	495
Spence et al, Hoing 7	3	435
Thompson & Callahan, Ira Lyons 1	3	387
B. F. Wireback, McAllister 9	2	423
MARION COUNTY—		
Adams Oil & Gas Co., Ingels 2	95	1444
Geo. Wasem 8-A	40	1445
Geo. Wasem 9-A	65	1450
Merryman 12	35	1426
Merryman 13	60	1395
Freyer 1	12	1435
Vermillion Oil Co., J. Simcox 1	85	1454
H. & H. Drilling Co., Gentry 1	65	1445
Lambert & Evans, Cahill 1	50	1451
Frederick et al, Ballance 1	50	1444
Ralph Ayers et al, Vandeventer 1	*	1725
Kirk D.Holland, Delay 1	*	1726
Helmrich & Payne, Spencer 1	*	2439
Boswell et al, Smith 1	*	1466
MASON COUNTY—		
Werner Bros., Ed Caslin 1	*	1000
RICHLAND COUNTY—		
Pure Oil Co., J. T. Palmer 3	594	2977
J. T. Palmer 4	357	2979
J. T. Palmer 5	1113	2977
J. Wilson 1	*	3050
Fortney Oil Co., Warden 1	240	2957
WABASH COUNTY—		
Patton Oil Co., J. K. Stillwell 3	35	1507
Geo. Randolph et al, C. F. Adams 1	*	1560
Joe Young et al, Fred Newkirk 1	*	1863
WASHINGTON COUNTY—		
Milliken et al, Leseman 1	*	1666
WAYNE COUNTY—		
Duncan Oil Co., Riggs 1	583	3040

OHIO

Company, Well and Location	Init. Prod. Bbls.	Depth
ATHENS COUNTY—		
C. W. Nuzum, Amos. Hixson 2	¶.10	1630
Williams Bros., Wm. Phillips 2	*	1010
BELMONT COUNTY—		
Huntsman & Peters, Wm. Schneider 1	¶2.50	1293
COSHOCTON COUNTY—		
Hulse & Kuntz, C. O. Moore 4	25	3280
FAIRFIELD COUNTY—		
City Natural Gas Works, A. O. Lamb 3	*	....
GUERNSEY COUNTY—		
Geo. Jewell, Ed Taylor	¶.18	1247
Chas. A. Branniger 3	*	1298
KNOX COUNTY—		
Davis & Rugg, F. C. Veatch 1	115	3194
Pure Oil Co., D. M. Miller 2	105	3139
Upham Gas Co., Geo. Young 1	*	2905
LICKING COUNTY—		
Rutledge & Mossholder Oil & Gas Co., Wm. Teagarden 12	5	756
Bebot & Son, H. W. Gleckler 3	*	683
LORAIN COUNTY—		
Wm. Dempsey, B. Urig 1	¶2.00	2410
MEDINA COUNTY—		
Edson et al, C. Billman 2	¶.14	2805
MEIGS COUNTY—		
A. N. Bengel, G. Boulard 4	¶.40	1490
Bowman et al, Harriett Musser 1	¶.15	670
C. Riley, G. Bossett 3	1	1782
Holmes et al, Nellie Smith 1	*	1665
MORGAN COUNTY—		
Blind Bros., Clifton Blind 3	*	406
MUSKINGUM COUNTY—		
H. W. Scott & Co., Wm. Myers 5	50	3500
Hopewell Oil & Gas Co., E. R. Myers 1	20	4300
Atha Realty Co., F. H. Clark 1	*	4620
PERRY COUNTY—		
Atha Oil Co., Melick Bros. 20	10	3095
C. Z. Ruth, Wm. Nuzum 19	4	1005
SCIOTO COUNTY—		
Dollar Oil & Gas Co., R. Graves 1	*	830
STARK COUNTY—		
East Ohio Gas Co., Bertha Hoffman 1	¶.75	4400
Henry G. Miller 1	¶.83	4114
TUSCARAWAS COUNTY—		
Natural Gas Co. of W. Va., Wm. F. Holshoy 1	¶.11	....
WASHINGTON COUNTY—		
H. H. Myers et al, J. Reimenschneider Heirs 1	40	1423
Henning & Hall, J. S. McKee 3	¶.15	1561
Wooster & Wooster, J. Fleeman 5	*	1700
Herlan & Smith, O. W. Lynch 5	*	1250
WAYNE COUNTY—		
Ohio Fuel Gas Co., Edward Schwarm 1	¶	4172

WEST VIRGINIA

Company, Well and Location	Init. Prod. Bbls.	Depth
BOONE COUNTY—		
Owens Illinois Glass Co., Allen & Pryor 23	¶.12	2350
CABEL COUNTY—		
Fairfax Gas Co, Leonard Paugh 2	¶.36	3765
Wilson & Walton, Wilson & Walton 1	¶.19	2987
Swan GasCo., A. J. Nicely Heirs 1	¶.19	3235
CALHOUN COUNTY—		
Kenny M. Hunt et al, Lena Weir 1	¶.15	2269
McCall Drilling Co., W. H. Walters.	¶.06	1960
GILMER COUNTY—		
Pittsburgh & West Virginia Gas Co., S. A. Hays 1	¶.64	1547
A. M. Beall 7626	¶	2150
Massey & Jarvis Drilling Co., Gainer & Wilfong 1	¶.50	1355
Ivan Bush 1	¶.20	1643
B. S. Messenger 1	¶.10	1675
A. E. Ellis et al, Delbert Stalnaker 1	¶.70	1918
Gainer & Gunn, Wm. Lawrence 1	¶.23	1650
Paul Weekley, H. G. Woodford 1	¶.21	1480
Hope Natural Gas Co., Fisher Heirs 2	*	2260

(*See Next Page*)

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Write for Information

Company, Well and Location	Init. Prod. Bbls.	Depth
HANCOCK COUNTY—		
R. J. Braden Co., C. E. Brenneman 51	4	1240
KANAWHA COUNTY—		
Spartan Gas Co., Susan Legg 2	¶10.32	5008
Benedum & Trees, S. B. & L. D. Pauley 1	¶2.89	....
LEWIS COUNTY—		
McCall Drilling Co., Andrew Edmiston 1	¶.25	2143
LINCOLN COUNTY—		
W. C. Kingery, Guyandotte Co. 1	20	1500
Three H Gas Co., J. W. Roberts 1	¶.04	3315
MARION COUNTY—		
Eshenbaugh Oil & Gas Co., Walter D. Straight 1	¶.08	3450
MARSHALL COUNTY—		
Manufacturers Light & Heat Co., C. J. Hoffman 2	¶.45	3107
PLEASANTS COUNTY—		
Ward & Deem, Cassie Dye Heirs	4	1240
W. J. McCullough, W. J. McCullough 1	¶.20	1690
PUTNAM COUNTY—		
V. C. Smith et al, Thomas Gibson 2	¶.60	1047
RITCHIE COUNTY—		
E. B. Rich, Clark Scadden 1	1	2038
Bickel Oil Co., John Hill 2	1	1806
Clem S. Morris, E. C. Wrick	1	1878
ROANE COUNTY—		
L. C. Young et al, Brell Kee Heirs 1	¶.35	1565
Witago Oil Co., S. M. Silcott Heirs 1	*	1770
TYLER COUNTY—		
American Oil Development Co., L. Pierpont 2	¶3.70	2185
WAYNE COUNTY—		
G.T. & G.B. Ray, Asa Smith 1	¶.35	3400
Chartiers Oil Co., Oliver Viers 1	¶.30	3810
Mountaineer Gas Co., Otto Adkins 2	¶.15	3485
Hartley Ferguson 1	¶.05	3314
WETZEL COUNTY—		
Manufacturers Light & Heat Co., C. & E. McCardle 1	¶7.00	2092
Brown Run Gas Co., E. L. Lough 1	1	2225
WIRT COUNTY—		
Glen W. Roberts, W. C. McConnaughley 5	*	3350
KENTUCKY		
BRECKENRIDGE COUNTY—		
Kentucky Natural Gas Co., Mack H. Brown 4	¶.07	555
A. V. Smith et al, Green Bros. 4	*	....
DAVIESS COUNTY—		
Ross & Henry, Tula Lamar 2	¶.93	625
FLOYD COUNTY—		
Francis et al, Booker Jones 1	5	1560
Fred Williams, Mrs. Woods 1	¶2.00	1510
Stanley Heirs 6	¶.79	2689
Stanley Heirs 5	¶.10	3790
Warfield Natural Gas Co., M. Endicott 4743	¶.08	2633
Francis et al, Jones 2	*	1638
HANCOCK COUNTY—		
J. C. Ellis, Link Richards 20	100	....
Johnson & Young, Cressie Huff 3	25	....
J. H. Taulbee, Ed Newton 2	¶.06	533
Galey & Fletcher, Tom Mason 1	*	542
HENDERSON COUNTY—		
Mecca Oil Co., C. M. Gish 21	100	725
KNOTT COUNTY—		
Hamilton B. Everage 11	¶.24	2753
LEE COUNTY—		
Thomas Whitmer, C. J. Tipton 4	*	....
McLEAN COUNTY—		
J. C. Miller, Geo. Bryant 3	*	1130
MAGOFFIN COUNTY—		
Jenkins, J. Adams 1	6	1170
MARTIN COUNTY—		
Warfield Natural Gas Co., Mable S. Agassiz 4748	¶.95	2847
Porter 4750	¶.33	2649
Virginian Gas & Oil Co., Freeland Preece V1253	*	1200
OHIO COUNTY—		
DeHart & Lykins, H. J. Odell Heirs 12	50	541
A. Tellers et al, A. H. Medcalf 7	7	700
Sherman Hall, W. W. Whittaker 2	*	990
Nollen Oil & Gas Co., Homer Robinson 2	*	985
B. & B. Oil Co., Ben Midkiff 3	*	750
POWELL COUNTY—		
E. A. Wireman, Kinser Heirs 1	10	....
Coleman Hall, S. R. Rogers 11	3	....
Mrs. Agatha Wireman, J. M. Townsend 21	5	....

*Failures; †Junked; ¶Million cu. ft. gas.

Bartlesville, Okla.—Oil company tax experts from Oklahoma and Kansas attended a dinner meeting at the Hillcrest country club here November 23. Principal speakers were William A. Murphy, of the Kansas Commission of Labor and Industry and C. C. Brown, Oklahoma Tax Commissioner.

CALIFORNIA FIELDS

Development of Strand strike will be conservative.

★ ★ ★

Discovery well of new Rio Bravo field holding up.

★ ★ ★

Middle Dome Kettleman Hills test may cause drilling.

Los Angeles.—With Ohio Oil Company holding a block of 1700 acres around its recently completed high-gravity discovery well in the Strand area of Kern County and Shell Oil Company holding leases on most of the desirable offset acreage, development of the new field will be along conservative lines.

Sufficient time has elapsed since completion of Ohio Oil Company's Kern County Land Company E-3 to label it a consistent producer. Drilled to 8175 feet, the test landed 7-inch casing at 8095 feet, ran 100 feet of 4¾-inch liner, including 80 feet of perforated, to 8173 feet, and initially yielded 2267 barrels of 36.9 gravity oil. The flow, accompanied by 1,700,000 cubic feet of gas, was through an inch choke. Tubing and casing pressures were 420 and 1575 pounds, respectively.

The Strand area wildcat is 3¼ miles northwest of the discovery well of Ten Section field in the same county, or in NE Section 14-30-25. Offsetting the discovery well, Shell Oil Company has a rig up on a location 1014 feet south and 4276 feet east from the NWc Section 14-30-24.

Strand was a geophysical prospect.

Work Scheduled at Greeley

The new Greeley field in Kern County apparently is controlled by Standard Oil Company, according to present indications but wells will be drilled on adjoining acreage. Standard's latest completion at Greeley was Fleishauer 3-1, Section 20-29-26, with bottom at 7855 feet, with plug set at 7760 feet. On a production test the well flowed 90 barrels an hour of 60.8 gravity clean oil, in addition to 55 million cubic of gas. The flow was through 96/64-inch choke; the pressure on the tubing was 760 pounds, 1150 pounds on the casing. The well has a shut-in pressure of 2300 pounds on the tubing and 2375 pounds on the casing. Standard's No. 11-2, Section 20-29-26, which was drilled to 7682 feet, with 9-inch cemented at 7725 feet, is to be drilled deeper.

World's Second Deepest Producer

Production of Union Oil Company's Kernco 1-34, discovery well for the new Rio Bravo field in Kern County, is 1520 barrels of 39.2 gravity oil, cutting less than 2 percent. The flow is through 28/64-inch choke with 2050 pounds pressure on the tubing and 1900 pounds on the casing. This is the second deepest producer in the world with bottom at 11,302 feet. Union is building rig for No. 2-34, located 330 feet north and 990 feet west from east quarter corner of Section 34-28-25. An offset to discovery well, to be drilled by Superior Oil Company, will be known as Wagner 1, the location being 990 feet south and 330 feet east from west quarter corner of Section 35-28-25. It is understood that locations to be drilled will be staggered, one well to 10 or more acres will be drilled.

In the general area a large amount of scattered acreage is held by Superior Oil Company. General Petroleum Corporation is also well protected with fee acreage to the south and to the southeast of the discovery well. The three companies mentioned control the entire general area.

Superior Oil Company's deep test for north dome, Kettleman Hills, has reached slightly better than 10,100 feet and

CALIFORNIA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
ROSECRANS—		
Union, Rosecrans	90	7557
WILMINGTON—		
Allied Pet. Corp., Allied 25	200	3705
Bankline Oil Co., Pac. Term. 8	90	3437
Exeter Oil Co., Exeter-Banning 2	250	3510
General, Patten 1	265	3600
Macson Oil Co., No. C-55-1	200	3643
Union Pacific Ry. Co., Offset 65	540	3350
Wilton Oil Co., No. 2	230	3640
BELRIDGE—		
Belridge Oil Co., No. 43-26	3250	8415
EDISON—		
Wood-Callihan Oil Co., 21 Com. 1	70	4462
ELK HILLS—		
Richfield, Crampton 1-H-A	275	3005
FRUITVALE—		
Meridian Oil Co., Turner 7	350	3038
GREELEY—		
Standard, K.C.L. 11-10	1870	7800
LOST HILLS—		
Standard, United 6	285	1592
MIDWAY SUNSET—		
Standard, Monarch 26-19	110	2710
Texas Co., Midway 28	305	2916
MOUNT POSO—		
Ring Oil Co., Lowden 2	90	1775
Sunset Oil Co., S. P. L. 1	100	1461
D. G. Vedder, B.N.B. 4	210	1752
MOUNTAIN VIEW—		
North American, Tupman 2	1200	5567
PREMIER—		
Pebble Beach Oil Co., Newhope 5	120	2620
ROUND MOUNTAIN—		
Calif. Western Oil Co., No. 7	425	1860
D. G. Vedder, Bell 1	400	1978
SANTA MARIA VALLEY—		
Linnell Pet. Co., Com. 1	50	3211
J. E. ODonnell, Lloyd 1	600	4759
Sunshine Oil Co., Del Parto 1	2000	4493
VENTURA AVENUE—		
Trice O&G Co., Valley 2	*	3704

*Failures; †Junked; ¶Million cu. ft. gas.

7-inch casing is cemented at 10,086 feet. It is reported Superior cored the deep Avenal zone at about 10,050 feet. Superior is seeking the deep oil sand found around 10,530 feet in Kettleman North Dome Association's No. 4-18J, which tested good for 1210 barrels of 46.7 gravity oil and 19 million cubic feet of gas with bottom at 10,753 feet. This latter test, a northwest edge hole, was drilled to 11,746 feet when drill pipe was stuck. Operators are now trying to recover it.

Oil Sand In Deep Test

Another interesting test, Temblor Oil Company's Bunting 1, Section 25-23-18, is drilling in the middle dome of Kettleman Hills at 9040 feet in oil sand. Gas showings have been marked for three weeks and at times weight of mud had to be increased to 100 pounds. Practically all of the middle dome is under lease.

Wilmington Slowing Up

Operations are fast slowing up in the Wilmington field and recent completions are for slightly better than 200 barrels flush production per well. The number of active drillers has been slowly declining for the past few weeks, as has been the number of new starts. The number of new locations the past two weeks has been on the increase, but most of them are for the Harbor area where actual starts have been held up due to suit demanding that titles be cleared before new wells are started.

The superior court at Long Beach has refused to grant permanent injunction against drilling in the new harbor area, in passing upon an application, seeking delay pending clearing of titles to lands in question. Therefore, it is probably that several wells will be started in this new area as soon as applications for permits to drill have been officially passed upon by the Long Beach Harbor Commission. Fifty applications have already been filed, but start of operations will be slow.

Japan is getting most of Pacific Coast oil exports

Los Angeles.—Due to the reported movement in certain international circles to restrict shipments of various products to Japan, it is interesting to note that in excess of 100,000 barrels of crude oil and various types of fuel oil is being moved daily to Pacific foreign ports from California in tankers. These figures do not include gasoline, lubricants or package goods.

During September, the Pacific foreign movement included 1,875,227 barrels of crude oil, 708,509 barrels of gasoline, 529,480 barrels of gas oil and distillates and 889,563 barrels of fuel oil. These figures do not include kerosene, lubricants, etc. It is thus seen that the grand total for the month exceeds 100,000 barrels a day, practically all to Japan.

It is understood that Japan is securing daily demands from California, and holding in reserve the large storage already in place. Should such shipments be forbidden, California producers certainly must reduce the present daily production of crude oil, and refinery runs

At present California's daily average production of crude oil is exceeding 700,000 barrels a day. If the shipments to Japan are stopped or even curtailed, there is trouble ahead for the California producer.

Union building tile line to handle salt water

Los Angeles.—Union Oil Company is spending approximately $200,000 on construction of a salt water pipe line to tidewater at the mouth of the Santa Maria River from the tank farm and pumping plant on the Battles ranch, southeast of Santa Maria.

Length of the line will be 14.5 miles. Approximately 16,635 feet will be of 12-inch pipe, 41,680 feet of 15-inch diameter and 26,070 feet of 16-inch dimension. The pipe will be unglazed clay. Capacity of the line will be approximately 50,000 barrels of water per day. The contract for the work was awarded to the Macco-Robertson Construction Company of Los Angeles. Fritz Karge, company transportation engineer, who designed the line, is supervising construction. Three months will be required for completion of the job.

It is contemplated that when this line is finished, another will be constructed from the Orcutt pump station to connect with the Santa Maria Valley line. To collect waters from the Santa Maria and Orcutt fields, about 30 miles of collecting lines also will be built.

E. M. PINCKARD and Gus Arnold, with The Pure Oil Company, Houston, went on a hunting trip to Southwest Texas last week-end.

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Ar. Dallas	8:45 PM	Ar. Houston	9:00 PM

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Southern Pacific Building, HOUSTON, TEXAS

IMPORTANT WILDCAT TESTS

ALABAMA

CHOCTAW COUNTY—Joe Modisett et al's McCorvey 1, se sw sw 20-9n-2w, elev 120 ft, top Selma chalk 1865 ft, top Eutaw 2913 ft, top Tuscaloosa 3525 ft, top Paleozoics 6650 ft, ran electrical tester, dry abn, td 7520 ft red beds.

GREENE COUNTY—Greene County Dev. Co.'s R. C. Lett 2, se nw 5-21n-2e, sd 115 ft.

HOUSTON COUNTY — Rice O&G Co.'s Oakley Est. 2, se nw sw 9-3n-29e, sd 4975 ft.

MOBILE COUNTY—J. C. Prine's King 2, ne ne 4-1n-4w, elev 135 ft, 10-in csg 300 ft, arr deepen 1100 ft (1100 ft s of No. 1). Grand Bayou O&G Co.'s J. A. Stafford 1, sw sw 24-7s-3w, lcn.

ARKANSAS

CALHOUN COUNTY—Hayner et al's Brandon 1, sw nw sw 34-11-13, dry abn td 3503 ft.

CLARK COUNTY—M. M. Martin's C. L. Cabe 1, nw nw 14-10-20, dr 2030 ft. hd rock.

COLUMBIA COUNTY—Kerrlyn Oil Co.'s Barnett 1, sw ne 14-17-20, logged porous sand so 5648-49 ft, cored sw sand 6061 ft, coring 6078 ft. Tide Water & Seaboard's C. N. Crumpler 1, nec sw 24-17-19, elev 282 ft, top lower Travis Peak 5420 ft, top lower red beds 7115 ft, top anhydrite 7500 ft, fsh 7568 ft. F. O Olds' Mary Dennis 1, nw se sw 4-17-21, sd 4513 ft, contract depth.

DALLAS COUNTY—L. S. Gist et al's Goodgame 1, se sw sw nw 26-10-16, sd 1158 ft.

DREW COUNTY—Sloan Wells et al's Hardy 1, sec nw 3-14-7, rur.

HEMPSTEAD COUNTY—Easton, May & Murdock's R. M. LaGrone 1, ne ne 5-12-26, sdtr td 2944 ft.

LONOKE COUNTY—J. E. Russell's Gunter 1, se se 17-5-10, claim so 503-508 ft, sd repr rig 508 ft. Frank Silver's Chambers Est 2, sw ne sw 17-2-7, wo 1500 ft.

MILLER COUNTY—Freeman W. Burford's August 1, 8-20-27, arr perf and test again, td 6165 ft, old td 6230 ft. Odell Hinson's Montana Realty Co. 1, nw nw 3-17-28, pb to 5272 ft, perf csg tested sw, abn old td 5631 ft. Hearell & Burnett's Willie Wallace 1, se nw se 7-20-27, lcn.

NEVADA COUNTY — W. E. Lokey, Tr.'s Purifoy 1, 17-11-20, fsh 2220 ft.

OUACHITA COUNTY — Conenhaver Oil Corp.'s J. E. Evans 1, ne sw 20-11-19, co 1730 ft. O. F. Whittaker's C. C. Guttry 1, se sw se sw 21-15-19, 100 ft oih, wosr td 2180 ft. C. C. Guttry 2, se nw 21-15-19, lcn.

UNION COUNTY—W. D. Wingfield's Southern Kraft 2, sw ne 18-16-14, 7 in csg 2721 ft, arr test td 2728 ft.

CALIFORNIA

FRESNO COUNTY

CLOVIS—Central Valley Oil Co.'s No. 1, 1-12-20, dr shale 203 ft.

JACALITOS CREEK—Dauphin Dev. Co.'s Boone 1, 20-21-14, dr brown shale 2779 ft.

PANOCHE—J. A. Gauthier's Hubbard 1, 12-14-11, dr shale 490 ft.

JACALITOS HILLS — Jacalitos Pet. Co.'s Associated 1, 14-21-15, td 4890 ft, test 4662 to 4800 ft showed gassy muddy water.

HURON—Pure's S. P. 1, 31-18-17, dr brown shale 8428 ft.

CIERVO—Superior's No. 1, 20-16-13, grading lcn.

TRANQUILITY—Union's Nicholson 1, 17-16-15, lcn.

KERN COUNTY

DEVIL'S DEN—Amerada Pet. Corp.'s Beer 5, 22-26-19, dr hard brown shale 4293 ft.

WASCO—Continental's K.C.L. A-2, 8-27-24, td 11,584 ft, fsh dr pipe; K.C.L. B-1, 12-29-26, td 10,205 ft, redr at 7741 ft. Seaboard Oil-Tide Water Associated's K.C.L. C-1, 26-27-24, sd 10,213 ft.

ROUND MOUNTAIN—Freemont Oil Co.'s Olcese 2, 35-28-29, dr silty shale 2420 ft. J. J. Tavis' Olcese-Tavis 1, 4-29-29, sd 3700 ft. D. G. Vedder's Bell 1, 12-28-28, see completions.

ARVIN—General Pet.'s Houchin 1, 27-31-29, td 7926 ft, top granite 7921 ft, sd; Pauley 1, 22-31-29, rig. Petrex, Inc.'s No. 1, 32-31-30, rur.

BELRIDGE—General Pet.'s St. Helens 1, 12-28-20, dr shale 3747 ft.

GRAPEVINE—Honolulu Oil Corp.'s Honolulu-Associated 33-1, 33-12-19, spud 11/13, dr. Ohio's T.R.C. D-2, 23-11-19, dr sandy shale 1276 ft. Universal Cons. Oil Co.'s Tejon 1, 33-11-19, dr shale 1050 ft.

STRAND—Ohio's K.C.L. E-3, 14-30-25, td 8175 ft, ran liner, preparing to complete. Shell's K.C.L. A-72, 14-30-25, rig.

KERN FRONT—Pacific Oil & Gas Dev. Co.'s Davidson 2, 36-27-27, dr shale 2630 ft.

McKITTRICK—Rocime Oil Co.'s No. 1, 20-30-22, rur.

MOUNTAIN VIEW AREA—Section Six Oil Co.'s Johnston 1, 6-31-29, dr shale 6600 ft.

SAN EMIDIO—Shell's No. 4-26, 26-11-22, grading lcn.

KERN RIVER—Sleeper Ridge Oil Corp.'s No. 1, 15-29-28, sd 1435 ft.

TEN SECTION AREA — Standard's Randolph Com. 2, 27-30-26, td 7612 ft, dr pipe test recovered mud gas cut.

SEMI TROPIC—Standard's Routzong 1, 14-27-23, dr sand and shale 5260 ft.

McFARLAND—Stone & Freid's No. 1, 34-25-25, rig.

MOUNT POSO—Summit Oil Co.'s Glide 1, 31-27-28, rur. Paul F. Travis' Giffin 1, 10-27-28, spud 11/16, dr.

GREELEY AREA—Superior's K.C.L. 9, 3-30-26, td 7870 ft, pumping mud and water.

SOUTH MARICOPA—Texas Co.'s No. 1, 33-11-23, dr gray sand 4970.

MISCELLANEOUS

GLENN COUNTY—Ohio's Willard 1, 18-20-2, spud 11/17, dr.

HUMBOLDT COUNTY—Texas Co.'s Eureka 2, 22-3-1, td 7708 ft, shut in.

KINGS COUNTY — Pyramid Prod. Co.'s Retherford 1, 27-24-18, dr shale 1258 ft.

MERCED COUNTY—Amerada's Carano 1, 19-10-11, td 5167 ft, ran test, flowed salt water.

SAN JOAQUIN COUNTY—Standard's Weil-Zucker 2, 25-2-4, td 6127 ft, ran formation tester, recovered gas cut mud and salt water.

SAN MATEO COUNTY—Wilshire Oil Co.'s Cowell 1, 20-6-5, (Half Moon Bay), dr shale 4015 ft.

SOLANO COUNTY—Amerada's Deterding 1, 36-4-2, td 4377 ft, shut in.

TULARE COUNTY—Magnet Oil Co.'s A. O. G. 3, 29-24-24, sd 7555 ft. Standard's Crocker Est 1, 6-25-24, lcn abn; Morris 1, 36-24-34, dr shale 10,200 ft. Trico Oil & Gas Co.'s Bryson 1, 20-24-23, td 2466 ft, gas well, shut in; Valley 2, 35-21-25, td 3704 ft in gray sand, abn.

YOLO COUNTY—Standard's E. E. Hooper 1, 32-9-1, td 5181 ft, redr to 3700 ft, gas, shut in.

SANTA BARBARA COUNTY—O. C. Field Gaso Corp.'s Continental 2, 4-8-32, td 3714 ft, to deepen.

MONTEREY COUNTY—Amil A. Anderson's Hillman 1, 15-24-14, dr conglomerate 2510 ft.

SAN LUIS OBISPO COUNTY—Cholame Synd.'s Jack 2, 10-25-15, td 3641 ft, co. A. O. Lewis' Pecho 1, 34-30-10, sd 2750 ft. Little Cuyama Oil Co.'s No. 1, 3-10-26, td 2820 ft, lost circulation. Temblor Oil Co.'s No. 1, 22-31-21, sd 3050 ft. Vanguard Oil Co.'s Clark 1, 26-27-14, dr shale and sand 976 ft.

SANTA BARBARA COUNTY—Carpinteria Oil Co.'s No. 1, 34-4-2, rur. O. C. Field's Santa Rita 1, 11-7-33, td 3358 ft, to deepen. C. B. Gauthier's No. 17-1-A, 22-4-26, (Summerland) driving piles. Standard's L. F. Land & Oil 1, 27-9-33, rur. United Western Oil Co.'s No. 1, 16-7-30, sd 1032 ft. Vista Del Mar Oil Co.'s Williams 1, 16-4-26, sd 4120 ft.

VENTURA COUNTY—W. M. Lewis' Johnson 1, 15-1-22 (Oxnard), sd 1038 ft. Oxnard Oil Co.'s Vanomi 1, 10-1-22, (Oxnard), td 6302 ft, plug 6200 ft, sd. So. Calif. Dr. Co.'s W. P. D-2, 26-2-21 (Oxnard), dr shale 1968 ft. Vaca Oil Explor. Co.'s Lennox 1, 6-1-21 (Oxnard), rur; Livingston 1, td 4270 ft, pumping 15 bbls 11 gravity, cut 42 percent. Richfield Oil Corp.'s McFarland 1 13-2-21 (Camarillo), dr shale 5297 ft. Texas Co.'s Edwards 1 (Camarillo Area), rur.

ABBREVIATIONS

The following abbreviations, signs, etc., are used in completions and wildcat reports in THE OIL WEEKLY.

*—*dry hole abandoned well.*
‡—*salt water (completions).*
†—*junked and abandoned.*
¶—*million feet of gas.*
abd—*abandoned.*
bbls—*barrels.*
br—*building rig.*
b.s.—*basic sediment.*
csg—*casing.*
co—*cleaning out.*
dd—*drilling deeper.*
dk—*derrick.*
dr—*drilling.*
fsg—*fishing.*
ft—*feet.*
hfw—*hole full of water.*
in—*inches.*
lcn—*location.*
m—*milling.*
mim—*moving in materials.*
mit—*moving in tools.*
mot—*milling on tools.*
n, s, e, w—*north, south, east, west.*
oih—*oil in hole.*
owdd—*old well drilling deeper.*
owpb—*old well plugging back.*
pb—*plugged back or plugging back.*
r—*reaming.*
rog—*rig on the ground.*
rur—*rigging up rotary tools.*
rust—*rigging up standard tools.*
sd—*shut down.*
sdtr—*sidetracking.*
sg—*show gas.*
si—*shut in.*
so—*show oil.*
so&g—*show oil and gas.*
spd—*spudding.*
sr—*straight reaming.*
sw—*salt water.*
td—*total depth.*
ur—*underreaming.*
wih—*water in the hole.*
wo—*workover.*
wocs—*waiting on cement to set.*
wosr—*waiting on standard rig.*

SOUTHERN CALIFORNIA

WILMINGTON—Alford Dev. Co.'s Class. Yards 3, 22-4-13, dr shale 3626 ft, no showings.

NEWHALL—Barnsdall's Rancho S. F. 2, 26-4-17, td 5090 ft, redr at 4293 ft. West Coast Dev. Corp.'s Newhall Land 1, 27-4-16, grading lcn.

MONTEBELLO — British American Oil Prod. Co.'s Pico 1, 12-2-12, td 3990 ft, tests of three gas zones showed water in each, sd.

MONTEREY PARK — Monte Cristo Pet. Co.'s Garvey 1, 27-1-12, ready to spud.

PICO CANYON—Downey Oil Corp.'s No. 1, 36-4-17, dr hard sand 2412 ft.

PALOS VERDES—Hunter-Devlin & Associates' 1, 17-4-13, td 5502 ft, plug 5452 ft, tested showings, wet, recementing 7 in at 5182 ft.

WALNUT—Julian & Criswell's Langstaff 1, 5-2-9, sd 2855 ft.

PALOS VERDES HILLS—McClaren Bros.' No. 1, 27-4-14, td 3970 ft, redr to 1875 ft, sd; No. 2, rigged up, standing.

TICK CANYON—Mint Canyon Pet. Co.'s Jennings 1, 35-5-14, spd 11/14, dr volcanics.

CASTIAC—Royal Lands Corp.'s Romona 1, 8-4-17, dr hard shale 386 ft.

GARDENA—Texas Co.'s Gardena Com. 5-1, 30-3-13, dr sand 1078 ft.

ORANGE COUNTY—Shell's Harbeson. 1, 9-4-10, dr shale thin streaks sand 7675 ft.

COLORADO

ARCHULETA COUNTY — Prospect Oil Syndicate, Garrett 1, sw sw ne 13-33n-2e, running 10-in csg 290 ft.

BOULDER COUNTY—J. B. Furstenberg, Foote 1, se¼ 20-1n-70w, dr 2725 ft.

LARIMER COUNTY—Great West Oil & Gas Co., Haworth 1, csw se 16-4n-60w, running tubing to test 3887 ft.

LINCOLN COUNTY — Gulf Oil Corp., Union Pacific 1, csw se se 19-15s-58w, dr 6652 ft Mississippi lime.

LOGAN COUNTY—Transylvania Development Co., Sheldon 1, ne¼ 3-10n-55w, rust.

PARK COUNTY—South Park Oil Co., Lemarr 1, ne ne se 34-11s-75w, dr 5370 ft, so.

RIO BLANCO COUNTY—Texas Co. & California Co., Freeman 1, cse¼ nw 35-3n-94w, dr 6275 ft.

ROUT COUNTY—Major Oil Reserve of Colorado, Inc., State 1, sw nw 17-6n-86w, mim.

ILLINOIS

BOND COUNTY — J. M. Huber Corp.'s Kunz 1, se nw nw 11-6n-5w, td 3021 ft, to run 5½-in csg. Universal Wells Serv. Co. et al's Molder 1, nw nw nw 24-6n-4w, dr 875 ft. A. T. Whitehead et al's Pollan 1, nw se sw 26-6n-2w, sd 2633 ft.

CHRISTIAN COUNTY — Parshall-Graham Co.'s Yockey 1, sw sw ne 36-15n-2w, pb to 1964 ft, to test so 1946-52 ft. Rogers Bros. et al's Johnson 1, ne se se 27-12n-2w, sd 1052 ft. Siegel & Schlosberg's Glass 3, nw nw sw 29-12n-2w, sd 1052 ft.

CLAY COUNTY—Southern Ill. Pet. Co.'s Knodacker 1, nw se sw 23-3n-7e, dr 2187 ft. C. H. & C. Oil Co. et al's Duff 1, cs½ nw ne 7-3n-8e, dr 3073 ft. J. E. Milburn's Striegle 1, se nw ne 19-3n-8e, der. Gulf Ref. Co.'s Laugh-

ton 1, nw ne nw 29-4n-8e, td 3234 ft, to shoot. Bonnie Oil Co.'s Schnautz 1, se sw ne 31-4n-8e, set 10-in csg 180 ft, woc.

CLINTON COUNTY—Gross et al's Eversgerd 1, sw nw sw 22-1n-4w, td 942 ft, D&A. Adams O&G Co.'s Schmidt 1, se se ne 2-1n-1w, td 1384 ft, sdo. R. E. Dalton's Clifton 1, ne sw sw 15-1n-4w, dr 300 ft. W. C. McBride's Schultte 1, sw sw ne 3-2n-4w, dr 145 ft. Holley & Willis' Muex 1, ce½ ne ne 18-3n-2w, dr 405 ft. P. J. Campbell's Allen 1, sw sw nw 28-3n-2w, mach. Ellzy et al's Williams 1, sw nw sw 1-3n-1w, der. McClanahan Oil Co.'s Hester 1, cn½ sw 26-3n-1w, dr 1425 ft. Schlosberg & Seigel's Monken 1, ne sw sw 4-2n-1w, dr 600 ft.

COLES COUNTY — W. J. Miller et al's Tomberlin 1, se se se 21-11n-10e, spd.

CUMBERLAND COUNTY—Jolly-Hill-Stipes et al's Jenkins 1, se ne ne 30-10n-9e, dr 1700 ft.

EFFINGHAM COUNTY—Kingwood & Carter Oil Co.'s Bartel 1, ce½ ne nw 26-6n-5e, td 4102 ft, testing. Carter Oil Co.'s Pruemer 1, cw½ sw ne 11-8n-7e, dr 1710 ft.

FAYETTE COUNTY—Belcher et al's Crawford 1, nw ne ne 35-4n-1w, td 1609 ft, D&A. Hurricane Creek Oil Co.'s Moore-Clayton Van Zandt 1, sw sw sw 24-6n-1w, set 10-in csg 196 ft. Hausman et al's Northwestern Ins. Co. 1, csw ne 22-6n-1e, spd. Carter Oil Co.'s Miller 1, cw½ nw nw 12-8n-3e, est. 25 bbls oil per day, sd for pump.

FRANKLIN COUNTY—Robert Markham's Whittington 1, ce½ sw se 18-5s-3e, lcn.

GREENE COUNTY—M. V. Yeager's Robinson 1, se sw nw 17-10n-11w, sd 175 ft. National Consumers Co.'s Jackson 1, nw ne nw 21-11n-12w, bailing to shoot.

HAMILTON COUNTY—J. Garfield Buell's Leach 1, cse se sw 22-3s-7e, td 3452 ft, sd for repairs. Carpenter et al's Clark 1-A, nw nw sw 32-3s-5e, spd.

JASPER COUNTY—C. R. Overmeyer's Atkins 1, nw nw ne 3-6n-9e, set 10-in csg 250 ft. LeWright et al's Wilkins 1, sw sw sw 36-6n-9e, C.&P. Denver P. & R. Co.'s Ochs 1, nw nw ne 33-6n-14w, rig.

JEFFERSON COUNTY—Siegel & Schlosberg's Schneider 1, ne ne se 15-1s-1e, td 1152 ft, clearing titles. Carter Oil Co.'s Tate 1, cw½ nw ne 10-1s-2e, dr 3610 ft. Sturbois & Tomberlin's Osborne 1, cnw se 8-2s-2e, ru mach. Nollem & Benoist's Kelly 1, ne nw ne 25-4s-2e, dr 900 ft. E J. Dees & W. J. Carter's Hamilton 1, ne sw nw 20-4s-3e, td 2908 ft, sdo.

MADISON COUNTY—Strauss et al's Robeson 1, nw se ne 16-3n-10w, dr 2812 ft.

MARION COUNTY—Dee & Nordan's Roddy 1, sw se sw 20-2n-3e, sd 2122 ft. Williamson-Taylor et al's Daniels 1, se¼ 18-2n-4e, dr 2065 ft. R. Benoist's Belcher 1, nw se sw 3-3n-1e, td 1575 ft, D&A. T. M. Conrey's Thalman Estate 1, ne nw nw se 9-3n-1e, td 1696 ft. Shell Pet. Corp.'s Lutz 1, sw ne ne 18-3n-1e, sdo 1706 ft. Marion Oil Co.'s Wilson 1, ne ne se 18-3n-3e, sd 1109 ft. Alexander et al's Allison 2, nw sw sw 33-4n-1e, td 1477 ft, sd. Coleman-Blosser's Britt 1, nw nw nw 36-4n-1e, dr 862 ft. Mahutske Oil Co.'s Nichols 1, se sw se 12-4n-4e, dr 2675 ft.

MASSAC COUNTY—Kahle et al's Harvick 1, sw sw sw 23-14s-3e, td 2831 ft, to core.

MONTGOMERY COUNTY—Schlosberg & Siegel's Nieman 1, cse sw 29-8n-5w, dr 402 ft.

RANDOLPH COUNTY—W. A. Delaney & J. E. Mabee's Wilson 1, ce½ se ne 3-4s-5w, dr 2422 ft.

RICHLAND COUNTY — Wiser Oil Co.'s Travette & Mattie Land Bank 1, cn½ ne se 8-2n-10e, der. Hollingsworth O&G Co.'s Waggoner 1, ne nw nw 5-3n-14w, der. Mammoth U. & R. Co.'s McCaulley 1, sw se nw 28-3n-9e, td 3146 ft. Sam Raieman's Richey 1, cne nw 12-4n-14w, lcn. Bill Loving et al's Blue Ridge Church 1, ne ne se 26-4n-9e, der. Ray & Alford's Franklin 1, nw nw ne 34-5n-10e, rig. Kingwood & McMahon's Negley Bros. 1, nw nw se 31-5n-9e, mirt. Frost's Farris 1, sw sw se 18-3n-10e, br.

SALINE COUNTY—Will Rogers et al's Saylor 1, se se se 3-10s-6e, dr 1125 ft.

SHELBY COUNTY—J. A. English et al's McClory 1, se se ne 14-10n-6e, fsg dr pipe at 1965 ft.

WABASH COUNTY—Martin et al's W. R. Wood 1, ne se nw 31-1n-12w, lcn.

WARDS COUNTY—Dr. W. F. Schmidt's Strenne 1, ne nw ne 5-1n-14w, rust. Leach Bros.' Lee 1, sw ne se 11-1s-10e, set 6⅝ in csg 2750 ft, td.

WASHINGTON COUNTY—Bittmer et al's Jesse 1, cse ne 16-3s-2w, mi cable tools.

WAYNE COUNTY — Benedum & Trees' Craig 1, se se sw 28-2n-7e, cor 3119 ft. J. W. Fitzpatrick & O. C. Meyers' Shannon 1, sw nw se 26-2n-8e, Aw 1500 gals, p. 105 bbls oil and 55 bbls wtr, 24 hrs, comp. R. R. Washburn Pet. Co.'s Acola 1, nw ne nw 31-2s-6e, td 3042 ft, set 6-in 2900 ft, woc. Benedum & Trees' Knapp 1 "A", ne ne ne 12-1n-6e, fsg 3267 ft. Benedum & Trees' Young 1, ne ne nw 7-1n-7e, C&P.

WHITE COUNTY—Davis & Harrell's Poorman 1, ne nw nw 5-4s-8e, dr 3185 ft.

WILLIAMSON COUNTY—Edward C. Snyder's Flemming 1, cse ne 9-10s-2e, rig corners.

KANSAS

BARBER COUNTY—Olson & Skelly Oil Co.'s Elsea 1, sw se nw 27-32s-14w, td 5248 ft, will pb to Miss. lime. Palmer Oil Corp. et al's Warwick 1, cnw 29-31s-10w, ru and sd. Kansan Oil Corp.'s Mease 1, ne se se 27-30s-11w, dr 3260 ft. Pryor & Lockhart's Pickens 1, cwl e½ sw 34-30s-14w, set 12-in csg 760 ft, woc at 1300 ft. Helmerich & Payne's C. Winter 1, nw nw sw 16-32s-10w, rot rig.

BARTON COUNTY—C. L. Price et al's Hammeke 1, ne ne sw 12-18s-12w, bailing. Arch Merriam et al's Norris 1, ne ne nw 33-17s-11w, dr 3075 ft. Martin & Foraker et al's Dick 1, ne sw sw 31-19s-11w, mim. Shell Pet. Corp.'s Ehrlich 1, sw sw sw 1-16s-14w, dd to 3296 ft, 2800 ft oih. Stanolind O&G Co.'s Hagen "A" 1, se se se 21-20s-11w, td 3333 ft, sso, rust. Elmer Ash et al's Frees 1, nw nw nw 34-16s-11w, rig. R. E. Day et al's Feltes 1, se se ne 14-16s-12w, sd 250 ft.

BUTLER COUNTY — Reeves & Kinnan's Heim 1, sw sw sw 5-29s-3w, rot rig. Steinbuchel et al's Fox 1, nw se ne 25-26s-3e, ru mach.

CHASE COUNTY—T. D. Duffy's Leedy 1, ne nw nw 26-22s-9e, rig.

CHAUTAUQUA COUNTY—C. L. Price et al's Garrett 1, nw sw nw 26-32s-11e, co 1545 ft. Harrison et al's Brown 1, ne se ne 19-34s-10e, sd 820 ft. W. G. Buffington's Fisher 1, cwl sw nw 10-34s-9e, sd 1677 ft, so. I. W. Siegle's Temple 1, sw sw sw 31-32s-12e, ru. Sooby et al's Davis 1, sw ne nw 29-33s-10e, ru mach. Ingot Oil Co.'s McKee 1, sw se sw 21-32s-12e, acidizing.

CLARK COUNTY—Olson Oil et al's Watkins 1, sw sw nw 23-32s-21w, dr 4848 ft. Olson Oil Co.'s Lehman 1, se se sw 20-32s-21w, set 12-in csg 722 ft, woc.

COWLEY COUNTY—Pryor & Lockhart's Brown 1, ne se se 34-33s-3e, co 3402 ft. G. M. Smith & C. L. Price's Henderson 1, sw sw sw 25-32s-6e, dr 2540 ft. Earl Wakefield's Whitson 1, sw ne se 8-32s-4e, dr 325 ft. Arthur Brewer Co.'s Shepherd 1, ne ne sw 20-32s-4e, set 8-in csg 2213 ft. Murta-Wilson et al's Stuber 1, se ne ne 27-30s-5e, set 10-in csg 1485 ft, co. Dickey Oil Co.'s Kansas G&E Co. 1, ne ne ne 22-34s-3e, rur.

EDWARDS COUNTY—Douglas & Gear's Meade 1, se se nw 35-25s-16w, sdo.

ELLIS COUNTY—P. G. Reynolds et al's Karlin 1, nw nw nw 13-12s-18w, sd 3420 ft. Skiles et al's Jensen 1, sw se ne 26-12s-18w, sd 2910 ft. Colonial Oil Co. & Bernheimer's Allbert 1, sw sw ne 13-12s-18w, ur 8-in csg 3095 ft. Brunson Drlg. & Glimac Oil Co.'s Weisner 1, se sw se 31-13s-17w, p. 1½ bbls oil per hour, pb-td 3624 ft, D&A. Glimac Oil Co. et al's K. C. Life Ins. Co. 1, se sw nw 5-11s-18w, rig. Colonial Oil Co.'s Hadley 1, se ne se 5-11s-18w, lcn. Bradley Oil Co.'s Jensen 1, nw nw se 36-11s-19w, dr 1665 ft. L. A. Hall's Heyle 1, se se nw 14-13s-16w, rig. Continental Oil Co.'s Baumrucker 1, ne ne sw 25-14s-16w, set 10-in csg 365 ft. Helmerich & Payne et al's Stebbens 1, nw nw se 7-13s-20w, lcn.

ELLSWORTH COUNTY — Colonial Oil Co.'s Hogy 1, nw nw sw 16-16s-10w, ru and sd. Hinkle et al's Andrea 1, ne ne se 17-17s-10w, run 15-in csg at 400 ft. Ralph Wixon et al's Peterman 1, sw sw sw 28-17s-10w, lcn.

FORD COUNTY — Olson Oil Co. et al's Fowler 1, csw¼ 26-27s-22w, dr 5459 ft.

GRAY COUNTY—P. G. Reynolds' Watkins 1, csw 32-28s-28w, rot rig.

GREENWOOD COUNTY—Eagle Oil Co.'s Stine 1, ne ne se 13-28s-10e, dr 750 ft. Whittaker & Johnson's Cannon 1, cel se nw 8-26s-13e, set 6-in csg 1185 ft, fsg. John Nichols et al's Central Life Ins. Co. 1, sw sw se 35-25s-12e, spd and sd. Chas. Reeser et al's Weide 1, nw nw se 18-25s-14e, sd 1150 ft.

HARVEY COUNTY — Allison & Fitzwilliams et al's Hawk 1, se sw ne 16-24s-1w, dr 2600 ft. Nat'l Ref. Co.'s Brown Bros. 1, nw se ne 22-23s-2w, rig.

JACKSON COUNTY—Lemmick Oil Co.'s Marble Savings Bank 1, cne ne 26-9s-14e, sd 510 ft.

JEWELL COUNTY—Hollingsworth Bros.' Wolfe 1, nw sw se 14-4s-8w, ru.

MARION COUNTY—Tom Palmer et al's Matz 1, sw sw se 8-19s-1e, dr 1850 ft.

McPHERSON COUNTY—C. E. Ash Drlg. Co.'s Broman 1, ne ne nw 19-17s-4w, sd 3408 ft. Dole-Park Dev. Co.'s Doles 1, ne nw ne 12-19s-1w, set 8-in csg 2775 ft, sd. Clyde Pulse et al's Boesker 1, se se nw 29-20s-1w, rig. Boyle & Grossman's Diener 1, se se ne 35-19s-1w, fsg 2320 ft. Carter Oil Co.'s Hoglund 1, cw½ sw nw 8-17s-3w, set 12-in csg 228 ft. Phillips Pet. Co.'s Galle 1, nw nw ne 11-21s-2w, set 13-in csg 157 ft. Thayer Drlg. & Brouk's Soderstrom 1, se se nw 21-17s-3w, lcn.

MEADE COUNTY—Pacific Mid-West Oil Co.'s Rexford 1, ne se sw 8-30s-29w, sd 900 ft.

MITCHELL COUNTY—Geo. Siedhoff et al's Greiss 1, nw sw se 16-8s-10w, td 4053 ft, D&A.

NESS COUNTY—Jones & Lane's Page Milling Co. 1, se se nw 36-18s-26w, fsg 3265 ft. Marshall Drlg. Co. et al's Anderson 1, sw sw nw 23-16s-24w, spd and sd. Trojan O&G Co.'s Moses 1, csw nw 10-18s-25w, dr 500 ft. Continental Oil Co.'s Olson 1, sw nw nw 5-18s-25w, dr 1000 ft.

PAWNEE COUNTY—Stanolind & Ameranda's Jentz 1, sw sw sw 25-20s-16w, td 3809 ft, rust. Phillips Pet. Co.'s F. A. Johnson 1, cne sw 8-20s-19w, dr 2605 ft.

PHILLIPS COUNTY—C. W. Davidson et al's Elliff 1, se ne ne 35-5s-18w, sd 350 ft.

PRATT COUNTY—Skelly Oil Co. et al's Adams 1, se nw ne 2-28s-11w, fsg 4300 ft. Colonial Oil Co. et al's Hays 1, se se sw 4-26s-12w, td 4325 ft, D&A. Pem Drlg. Co. et al's Holland 1, sw nw se 6-26s-12w, dr 3800 ft.

RENO COUNTY—Sam Schneider et al's Kroecker 1, ne ne ne 12-22s-5w, ur 6-in csg 3545 ft. Street & Butler's Kincaid 1, ne ne nw 13-24s-4w, ru and sd. Carey et al's McPheeters 1, ne ne nw 22-26s-8w, spd and sd. W. E. Witt et al's Fair 1, nw se se 4-22s-8w, sd 3100 ft. Cohen et al's Teter 1, se se sw 3-23s-5w, ru and sd. Westgate-Greenland Oil Co. et al's Popp 1, sw sw ne 7-25s-4w, td 3591 ft, 2000 ft wih, sdo. Albert Austin's Schwiethold 1, sw sw ne 17-23s-10w, dr 2300 ft. McCole et al's Mathews 1, sw nw nw 15-24s-10w, lcn.

RICE COUNTY—Gillespie et al's Strong 1, ne ne nw 9-18s-8w, spd and sd. John Hanna et al's Marshall 1, ne nw nw 30-18s-8w, sd 1530 ft. Skiles et al's Campbell 1, se se ne 28-19s-9w, td 2957 ft, sd. Fred Phillips et al's Oden 1, se ne nw 22-20s-7w, dr 2360 ft. Joe Aylward's Weihe 1, sw sw ne 23-18s-9w, br.

ROOKS COUNTY—Producer Oil Co. et al's Ham 1, sw sw nw 25-7s-19w, sd 200 ft. Graham et al's Fike 1, sw sw sw 9-9s-17w, fsg. C. R. Craft et al's Ziegler 1, ne ne sw 8-10s-16w, sd 3315 ft. The Texas Co.'s McCarroll 1, cwl nw 29-10s-17w, dr 3705 ft. Colonial Oil et al's Tucker 1, sw se nw 23-10s-17w, rur. Texa Trading Co.'s Probst 1, sw sw ne 18-6s-19w, dr 2500 ft. Producers Oil Co.'s Tucker 1, sw se nw 23-10s-17w, dr 1636 ft. Ross Oil et al's Hancock 1, ne ne nw 5-10s-17w, rur.

RUSH COUNTY — Wakefield & Brouk's Kerbs 1, nw nw se 11-17s-16w, dr 2215 ft.

RUSSELL COUNTY—Parks' Opdycke 1, sw sw sw 20-14s-13w, td 3180 ft, p. pot. 353 bbls oil, comp. Emrichs et al's Anderson 1, ne se sw 33-15s-11w, spd and sd. Murfin & Vernon O&G Co.'s Pearson 1, ne ne ne 31-15s-15w, dr 2405 ft. C. L. Price's Sebesta 1, ne ne ne 36-15s-11w, ur 5-in csg. Jones & Shelbourne's Short 1, ne ne ne 12-15s-12w, dr 970 ft. Phil-Han & Hinkle's Reinhardt 1, se se sw 19-14s-14w, cel.

SEDGWICK COUNTY—Nat'l Ref. Co.'s Fee

SPERRY-SUN WELL SURVEYING CO.

1608 WALNUT STREET, PHILADELPHIA, PA.

HOUSTON, TEXAS. TULSA, OKLAHOMA

AND LONG BEACH, CALIFORNIA

SURWEL (Gyroscopic) H-K (Open Hole) SYFO (Ink Bottle)

UNDERGROUND WELL SURVEYING SERVICE

1, se ne se 36-27s-2e, pb 3098 ft. I. W. Murfin et al's Martin 1, se se nw 18-28s-1ef swb 45 bbls oil, 24 hrs. W. C. Talbott et al's Downs Estate 1, se se nw 32-28s-2e, testing. Union O&R et al's Howell 1, sw sw sw 6-29s-1e, dr 2400 ft. Frank Hudson et al's Fulton 1, ne ne se 35-28s-1e, fsg 1550 ft. McKnab et al's Garrett 1, se sw sw 18-29s-1e, sd 100 ft. Continental Oil Co. et al's Oehlert 1, nw nw se 7-27s-4w, dr 3865 ft. Steinbuchel's Shaffer 1, sw sw nw 18-25s-1e, dr 2640 ft. Steinbuchel et al's McAdams 1, sw sw ne 28-29s-1e, spd and sd.

STAFFORD COUNTY — Hinkle et al's Moses 1, nw nw sw 9-22s-13w, set 10-in csg 2445 ft, co. Fred Rust et al's Drach 1, ne ne sw 12-22s-13w, p. 90 bbls oil, 1 hr. Stanolind O&G Co.'s Tiechman 1, se se se 13-22s-13w, pb 3733 ft. Torry & Feaster et al's McConnaughay 1, ne se nw 8-24s-13w, dr 4040 ft. Tom Palmer's Fair 1, se ne sw 10-22s-11w, dr 1700 ft. Torry & Feaster et al's Heggy 1, ne ne sw 26-23s-11w, rur. Stanolind O&G Co.'s Wadsack 1, sw sw ne 4-25s-11w, rur.

STEVENS COUNTY—United Prod. Co.'s Beardsley 1, cn½ 12-31s-35w, td 2722 ft, est. 3,700,000 cf gas, comp.

SUMNER COUNTY — W. M. McKnab's Blair 1, sw sw sw 7-30s-1e, td 3869 ft, testing. R. J. Wixon's Newton 1, se se se 31-30s-2e, dr 2975 ft. Magnolia Pet. Co.'s Baird 1, sw se se 2-30s-4w, pot. 378 bbls oil and 2½ bbls wtr, comp. Saco Oil & Cameron et al's Phipps 1, sw se ne 24-30s-1w, cel. Roth & Faurot's Fry 1, nw sw sw 8-31s-3e, dr 715 ft. Hugh T. Jones et al's Stunkel 1, se se sw 2-30s-1w, rig.

TREGO COUNTY—Phillips Pet. Co.'s Trego 1, cne nw 14-12s-23w, td 4290 ft, D&A. Thurman Hill et al's Lawson 1, sw sw nw 7-14s-22w, dr 4250 ft. Carlock's Kinzel 1, sw sw sw 9-13s-22w, spd and sd.

WOODSON COUNTY—Charles Reeser et al's Weide 1, nw nw se 18-25s-14e, sd 1150 ft.

NORTH LOUISIANA

BIENVILLE PARISH — De Soto O&G Co.'s Wm. Ashley 2, c sw se 15-16n-10w, rur. Gulf Oil Corp.'s Goodpine Oil Co. 1, se sw 25-14n-8w, elev 157 ft, top massive anhydrite 5303 ft, cored 16 ft porous oolitic lime, tested water and mud 5608-38 ft, killing sw flow, td 5691 ft. Hunt & Seaboard's Federal Land Bank 1, c s½ 10-16n-6w, 7-in cas 6857 ft, dr 7038 ft, hd dense lime.

CADDO PARISH—A. O. Olsen's R. T. Sharp 1, nw nw 15-18n-16w, tested mud 4752-4812 ft, arr make ds test 5609 ft. Prairie River Synd.'s Hutchinson 1, sw nw 15-15n-12w, elev 153 ft, top lower Marine 8380 ft, top Bodcaw sand 8775 ft, tested sg 8987-9110 ft, arr deepen, td 9141 ft. W. J. Hunter & Homer Hurley's N. B. Stoer 2, sw sw 10-15n-15w, rur. A. D. Robinson et al's Dickson 1, 22-20n-14w, woc 1300 ft.

CATAHOULA PARISH—G. E. Foster et al's W. S. Peck 1, c s½ 39-10n-8e, rur.

CLAIBORNE PARISH—J. B. Bond's Burgess 1, ne se ne 3-20n-5w, elev 276 ft, wosr, pb depth 5325 ft, old td 5800 ft. W. L. McClanahan's J. T. Lewis 1, sw se 25-20n-7w, dr 4490 ft, red shale and lime. Union Power Co. et al's Brownfield 2, 6-19n-5w, coring 7573 ft. Triangle Drlg. Co. et al's Hawks 1, 1-19n-6w, owdd, td 4553 ft.

DE SOTO PARISH—Clear Lake Oil Co.'s J. A. Woolums 1, nw nw 29-12n-12w, cored sand, so 2674 ft, wo 6⅝ in csg, td 2694 ft. Wright Harris et al's (Kingston Oil Co.), C. B. Scott 1, ne ne 32-14n-13w, co caving hole, td 2778 ft. La. Seaboard Oil Ref. Co.'s Lawrence 1, sw ne 36-12n-14w, dk.

LINCOLN PARISH—E. H. Moore, Inc.'s Commercial Bank 1, nw nw 22-18n-5w, day abn 6210 ft. E. T. Oakes, H. D. Easton et al's N. L. Griggs 1, c sw 36-18n-1w, 10-in cas 914 ft, dr 3740 ft, red beds.

RED RIVER PARISH—Ark. Fuel Oil Co.'s Franklin Realty Co. 1, ne nw 20-11n-9w, elev 135 ft, top chalk 1350 ft, 10¾ in csg 2001 ft, dr 2580 ft.

SABINE PARISH—Fox & Phillips' Cook Land Co. 1, 1-9n-12w, coring 3110 ft. Larry Romine's La. Long Leaf Lbr. Co. 1, 7-5n-12w, dr 4875 ft. Sutton Oil Co.'s Sabine Lbr. Co. 1, 23-7n-14w, lcn (10,000 ft test).

TENSAS PARISH—H. M. Jones' Chicago Mill & Lbr. Co. 2, c ne sw 31-12n-10w, rur. Desha Lbr. Co. 1, c ne se 17-13n-11w, dk.

UNION PARISH—Joe Modisett et al's Frost Lbr. Co. 1, ne sw 14-21n-1e, top Travis Peak 4050 ft, 9⅝ in csg 4358 ft, dr 5536 ft, red shale.

WEBSTER PARISH—Magnolia Pet. Co.'s Sexton 1, c sw ne 32-23n-9w, lcn (9000 ft test).

SOUTH LOUISIANA

ACADIA PARISH—W. O. Daniel's Setting 1, Trilby prospect, 17-9s-1w, dr shale 3689 ft. Gulf's Broussard 1, Midland area, 49-10s-2w, dr shale 8409 ft. Humble's Sarver 1, South Crowley prospect, 35-10s-1e, dr shale 9841 ft. Magnolia's Duson 1, Iota prospect, 14-8s-2w, dr shale 8573 ft. J. G. Markley et al's Daigle Farms 1, Churchpoint area, 19-7s-2e, abn 8506 ft.

CALCASIEU PARISH—D & D Oil Co.'s Lutcher Moore 2, nw of Starks, 1-8s-13w, dr shale 9350 ft. Republic Prod. Co.'s Sabine Tram 1, w of Starks, 25-8s-14w, fsh 9620 ft. Union Sulphur's American Oil & Sulphur Co. 1, s of Lake Charles, 16-10s-10w, dk; same operator's Bell 1, s of Sulphur, 10-10s-10w, abn 8473 ft.

CAMERON PARISH — Humble's Miami Corp. 1, Catfish Lake area, 8-14s-5w, woc 8957 ft. Shell's K. Bel Hanszen 1, Chalkley area, 22-12s-6w, canal. Superior's State 1, in Gulf of Mexico, off Section 4-15s-8w, circulating at 6711 ft.

EAST BATON ROUGE PARISH—Cavalier Oil Co.'s Elliott 1, Hope Villa area, 3-8s-2e, dr shale 6947 ft

IBERIA PARISH—Texas Co.'s State 2-B, in Vermilion Bay, 20-15s-6e, fsh 8971 ft.

JEFFERSON DAVIS PARISH—Continental's Fay 1, se of South Roanoke, 31-10s-3w, dr hard grey sand 8741 ft. Humble's Stegall 1, nw of Welsh, 20-9s-5w, dr shale 6872 ft. Union Sulphur's Calcasieu National Bank 1, e of Woodlawn, 12-9s-8w, coring shale 8315 ft.

LAFOURCHE PARISH—Amerada's South Coast Corp. 1, Raceland area, 34-15s-19e, dr shale 9659 ft. Gulf's State PP 3, Timbalier Bay, 36-23s-21e, running geophones. William Helis' City of New Orleans 2, Marchand area, 19-23s-23e, dr salt 9640 ft.

PLAQUEMINES PARISH — Gulf's State QQ 3, Quarantine Bay, 17-19s-19e, testing 8202 ft.

ST. BERNARD PARISH—Gulf's State RR 2, Lake Borgne, 38-14s-15e, dr shale 4290 ft.

ST. MARTIN PARISH—Shell's A. Frederick 1, Arnaudville area, 38-8s-5e, dr shale 942 ft. Shell-Tide Water's Unit 1, Lake Verret area, 11-14s-12e, driving piling. Texas Co.'s St. Martin Land 10, Henderson prospect, 15-8s-7e, dr shale 8590 ft; same operator's State 4, Lake Mongoulis prospect, 14-10s-9e, driving piling.

ST. MARY PARISH—Shell's Barbour 1, Glenwild prospect, 21-15s-12e, dr shale 8400 ft. Texas Co.'s State 1, Bateman Bay prospect, 21-16s-12e, washing to bottom, 11,050 ft.

TERREBONNE PARISH—Delarge Oil Co.'s Buckley 1, Dulac area, 77-19s-17e, dredging canal.

MICHIGAN

ALLEGAN COUNTY—Frank Vahue's Chadbourn 1, 23-2n-13w, testing so 1445 ft. Robert Lentz's Hitzler 1, 34-4n-12w, dr 230 ft. Arnold & Cochran's Arnold 1, 26-4n-16w, testing Traverse lime 1460 ft.

ARENAC COUNTY—R. L. Hill's Reinhart 1, 25-19n-5e, mim. D. F. Jone's Sibley 1, 33-20n-7e, dr 860 ft.

BAY COUNTY—Fortney Oil Co.'s Smart 1, 7-16n-5e, dr 1900 ft. Charles Weller's Dewyer 1, 20-16n-3e, dr 2560 ft. Stork Oil Co.'s Century 1, 9-17n-3e, dr 2400 ft.

CLARE COUNTY—Sun Oil Co.'s Weldon 1, 14-19n-3w, driving 10 in 210 ft. Wittmer Oil Co.'s Palomar 1, 2-18n-5w, dr 2100 ft. McClanahan Oil Co.'s Mortenson 1, 9-18n-5w, fsg 1665 ft. James A. McKay's Fee 12, 24-18n-5w, dr 460 ft.

GLADWIN COUNTY—Durham & Jone's LaFurgey 1, 20-17n-2e, csg 5 in 3410 ft. Forney Oil Co.'s Smart 1, 29-17n-2e, dr 1300 ft. Chapman Oil Co.'s State 1, 33-17n-2e, dr 3000 ft. McClanahan Oil Co.'s Connoly 1, 35-17n-2e, dr 1000 ft; Reua 1, 11-17n-1e, Dundee 3469 ft, so 3559 ft, sd 3677 ft. W. E. Ross' Kinyon 1, 18-18n-2e, rig. Charles E. McLaughlin's Simmons 1, 28-19n-2w, fsg 3410 ft. Dapar Oil Co.'s Villeneuve 1, 11-20n-2w, dr blue shale 4032 ft.

GRATIOT COUNTY—Turner Pet. Corp.'s Wiley 1, 5-11n-3w, dr 1990 ft. Chartiers Oil Co.'s Bolyard 1, 12-9n-4w, dr 900 ft.

HURON COUNTY — L. D. Hendershot's Klamp 1, 1-17n-14e, sd 2029 ft. C. W. Teater's Martin 1, 15-15n-11e, dr 1600 ft.

ISABELLA COUNTY — J. V. Wicklund's Lawen 1, 24-5n-5w, rig. Cryden & Rowmor's Smith 1, 35-15n-5w, csg 10 in 1411 ft. J. G. Zabel's Kennedy 1, 25-14n-4w, dr 1468 ft.

MIDLAND COUNTY—Sun Oil Co.'s State B1, 5-16n-1w, Dundee 3801 ft, so 3849 ft, sd to acidize 3955 ft. Daily Crude Oil Co.'s State 1, 29-15n-2e, 6 in csg 1370 ft.

MONTCALM COUNTY — L. T. Barber's Sager 1, 20-12n-7w, sd 3476 ft. R. M. Burch's Houghton 1, 6-12n-6w, sd 710 ft. H. L. Gentry's Christensen 1, 29-11n-8w, sd 1255 ft. Hirzel-Leland's Hansen 1, 31-10n-7w, sd 850 ft.

NEWAYGO COUNTY — Midstate Corp.'s Eichenberger 1, 7-16n-11w, sd 3175 ft. Muskegon Dev. Co.'s Carlson 1, 9-16n-11w, dr 3389 ft.

ROSCOMMON COUNTY — Franklin Pet. Dev.'s Helen 1, 26-23n-2w, dr 1900 ft. Maynard Smith's Eggleston 1, 32-21n-2w, fsg 800 ft.

SAGINAW COUNTY—Bridgeport Oil Co.'s Tobias 1, 35-11n-5e, sd 1700 ft. Hogan, Inc.'s Price 1, 2-11n-1e, rig.

TUSCOLA COUNTY—Frank Norton's Vorhees 1, 8-12n-11e, Dundee 2945 ft, sd 3055 ft. Jaenicke & Brehm's Boyce 1, 24-14n-7e, Dundee 2597 ft, so 2816 ft, sd 2848 ft.

MISSISSIPPI

BOLIVAR COUNTY—White & Jones' Ballou 1, ne ne 18-24n-7w, sd 1681 ft.

CALHOUN COUNTY—Ed Spencer's J. C. Conner 1, se ne 12-24n-8e, lcn. B. G. Dowell's H. D. Hughes 1, 18-23n-9e, sd 1600 ft.

CLAIBORNE COUNTY—Claiborne County Dev. Co.'s Ruth Hayden 1, s½ se 55-11n-2e, 10-in csg 200 ft.

FRANKLIN COUNTY—Fred E. Courson et al's Homochitto Lbr. Co. 2, 300 ft n c 18-5n-3e, elev 320 ft, sg 756-62 ft, top Cockfield 2753 ft, top Minden 3205 ft, dry abn, td 5011 ft.

GEORGE COUNTY—Cleve Love et al's J. J. Newman Lbr. Co. 2, c sw 9-1s-8w, spd, arr set 10-in csg 1500 ft.

HINDS COUNTY—Black River Oil Co.'s Federal Land Bank 1, ne ne 11-15n-5w, mim. Cleve Love et al's S. F. Johnson 1, ne se 29-6n-1w, mim. Southern Nat. Gas Co.'s Angelo

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Williams 1, ne nw 35-6n-4w, elev 183 ft, 22-in csg 89 ft, 13⅜ in csg 416 ft, top Wilcox 2631 ft, dr 2765 ft sandy shale.

KEMPER COUNTY—R. A. Keaton et al's Buckwalter Lbr. Co. 1, nec 6-10n-14e, dk.

LAMAR COUNTY—Sun Oil Co. et al's Mrs. Kate Talley 4, se nw 33-4n-15w, dr 6106 ft red beds. South Miss. Oil Co.'s Morris 1, sec 4-2n-14w, spd and sd.

PERRY COUNTY—Phillips Pet. Co.'s J. J. Newman Lbr. Co. 1, se se sw 21-2-10w, 20-in csg 180 ft, woc 10¾ in csg 1532 ft.

SIMPSON COUNTY—Goodwill O&G Co.'s Berry 1, 33-2n-4e, woc 10-in csg 60 ft.

WILKINSON COUNTY—A. B. Taylor et al's Foster Creek Lbr. Co. 2, nwc 32-4n-2w, (amended lcn), rur.

YALABOUSHA COUNTY—Acme Holding Co.'s S. D. Boyle 1, nw nw 33-25n-7e, elev 285 ft, dr 205 ft. Skuna Dev. Co.'s Mrs. T. A. Turner 1, se sw ne 25-25n-6e, sd 925 ft.

FLORIDA

LAKE COUNTY—Oil Dev. Co. of Fla.'s Gulf Expl. Co. 2, se se 17-24s-25e, elev 120 ft, arr set pckr and retest at 2600 ft, old td 6126 ft.

LEVY COUNTY—Fla. Oil Discovery Co.'s Sholtz 2, sw sw ne 9-15s-13e, dr 1570 ft, last report.

NASSAU COUNTY—St. Mary's River Oil Corp.'s Hilliard Turpentine Co. 1, nw ne se 19-4n-24e, elev 110 ft, dr 3768 ft lime.

SUWANEE COUNTY — Wm. G. Blanchard's Lucy Cotton 1, se ne 35-3s-11e, elev 70 ft, re-setting 16-in csg at 190 ft, to eliminate caving hole.

OKLAHOMA

ADAIR COUNTY — B. L. Maddox' Penn Mutual Life Ins. Co. 1, cs¼ ne nw 5-16n-24e, dr 260 ft.

ATOKA COUNTY—C. M. Sheldon & Gardner Pet. Co.'s Lee 1, ne nw sw 2-4s-10e, fsg bit 1502 ft. Hagey et al's Becker 1, cne¼ 4-1n-13e, td 3010 ft, to pb. Hagey et al's Peck 1, cne¼ 6-1n-13e, woc 2766 ft.

BRYAN COUNTY — Southern Oil Co.'s Henry 1, cnw ne 10-8s-7e, dk.

CADDO COUNTY—I. T. I. O. Co.'s Dome-Bo 1, cne se 29-6n-10w, dr 5685 ft.

CARTER COUNTY—E. M. Boring's Sullivan 1, se se sw 6-5s-1e, abd 2508 ft. Lloyd Noble's Revelle 1, sw sw se 21-3s-2w, dr 2412 ft.

CLEVELAND COUNTY—Harper & Turner's Pollock 1, cw½ nw nw 13-9s-2w, dp stuck 6850 ft.

CHOCTAW COUNTY—V. K. Chapman & Lowe's Hallum 1, nw nw ne 4-7s-20e, dr 240 ft. J. A. True's Boby 1, nw se nw nw 17-7s-19e, lcn.

COAL COUNTY—Phillips' Beck 1, se sw sw 6-1n-9e, dr 5250 ft. Carter et al's Claytor 1, cw¼ ne sw 27-2n-9e, testing 6415 ft.

COMANCHE COUNTY — J. W. Wolfe's Costinus 1, sw sw se 30-4n-11w, spd.

COTTON COUNTY—J. W. Amyx' Ash 1, se se se 7-4s-10w, dr 1257 ft.

GARFIELD COUNTY—H. R. Hollenback et al's Clark 1, nw nw nw 34-21n-6w, di 5325 ft.

GARVIN COUNTY—Carter's Potts 1, ce½ se nw 36-1n-3w, abd 4155 ft. B. C. D. Edward's Clark 1, ne ne ne 16-3n-3e, td 2676 ft, dp stuck.

GRADY COUNTY—Gulf's Thomas 1, sw nw nw 14-4n-5w, dr 9040 ft. Doyle Pet. Co.'s Huffine 1, nw nw se 30-5n-8w, dk.

GRANT COUNTY—Magnolia's Reynolds 1, ne ne se 19-25n-5w, dr 2715 ft.

HUGHES COUNTY—Phillips' Becker 1, ne nw sw 8-5n-10e, cor 4460 ft. Pure's Rogers 1, se se ne 18-8n-12e, dr 4650 ft.

JOHNSTON COUNTY — W. T. Shelton's Chapman 1, cnw nw 26-4s-6e, fsg bit 2510 ft.

KAY COUNTY—E. J. Shaffer et al's McKee 1, ne ne nw 20-28n-1w, dr plugs and fil 300 ft sw, sdo, td 2415 ft.

KIOWA COUNTY—Hughes & Reese' Fultz 1, se se se 10-6n-18w, dr 1005 ft.

LINCOLN COUNTY—C. L. Carlock et al's Young 1, cn¼ nw nw 23-15n-5e, ream to core.

LOGAN COUNTY—Anthony & Marshall's Fruin-Eckman 1, se se sw 4-16n-1e, so&g, sd 5181 ft. Texas Co.'s Roper 1, cw½ sw se 22-15n-1e, dr 5240 ft.

LOVE COUNTY—Sinclair Prairie's Peabody Seating Co. 1, ne ne ne 35-6s-2w, lcn.

MAJOR COUNTY—Ed Parsons' Patzkowsky 1, cnw¼ 10-20n-11w, rig.

MUSKOGEE COUNTY—F. E. Cusack's Elliott 1, cnl nw sw 20-15n-20e, rog. Cusack's Fee 1, ne sw se 20-15n-20e, spd 65 ft.

OKFUSKEE COUNTY—Burke-Greis' Rhea 1, sw sw se 14-10n-9e, abd 3895 ft. Mid-Continent's Ireland 1, sw ne sw 10-13n-10e, rig.

OKMULGEE COUNTY—Phillips' Wood 1, nw sw sw 31-11n-13e, rig.

PAYNE COUNTY—H. S. Brim et al's McKenzie 1, cwl se ne ne 13-18n-3e, c&p. Stanolind & Amerada's Bennett 1, nw se ne 31-19n-4e, woc at 211 ft. Mid-Continent Pet. Corp. et al's Ramsey 1, sw sw nw 18-18n-2e, bldg rig.

PITTSBURG COUNTY — Okla. Dist. Oil Co.'s Beeler 1, ne ne sw 7-7n-14e, dr 5840 ft. Phillips' Gilcrease 1, nw nw se 16-7n-12e, dr 5495 ft.

PONTOTOC COUNTY — H. W. Lee's Weatherly 1, nw se nw 24-1n-7e, rig.

ROGER MILLS COUNTY — Central Pet. Corp.'s Lambe 1, se se se 27-14n-21w, c&p.

SEMINOLE COUNTY—Stanolind, Amerada and Mid-Continent's Salina 1, se ne nw 4-5n-6e, aw 3000 gals, p. 80 bbls oil, 7 hrs. J. F. Root's Cone 1, nw ne sw 11-7n-5e, c&p. W. B. Osborne et al's Harris 1, nw nw nw 11-6n-5e, dr 2600 ft. W. C. McBride's Jackson 1, ne ne sw 16-6n-7e, spd. H. V. Woodson & Marydun Oil Co.'s Gilliland 1, se se sw 24-11n-7e, set 16¾ in csg at 60 ft, woc.

STEPHENS COUNTY — Coline Oil Co.'s Johnson 1, sw se ne 1-2n-8w, swbng. Ed Parsons et al's Blake 1, csw nw 22-2n-8w, dr 5745 ft. Jack Cohen's Pierce 1, ne ne nw 24-2s-6w, abd 1877 ft.

WASHITA COUNTY — John Koberg's Harms 1, nw nw ne 6-10n-16w, abd 4190 ft.

EAST TEXAS

ANDERSON COUNTY—Humble's Southern Pine Lumber Co. 1-C (210-ac), John Morton sur, 2 mi ne Jarvis, elev 339 ft, top Woodbine 4284 ft, top Georgetown lime 5040 ft, top first anhydrite 7400 ft, dr dense lime 8280 ft. H. L. Parsons et al's H. B. Hemby 1 (213-ac), John Gossett sur, 7 mi ne Navarro, rig.

BOWIE COUNTY—King Oil Corp.'s W. W. Ames 1, J. A. Talbott sur, 4½ mi nw Texarkana, dk.

CHEROKEE COUNTY—Merica Oil Co.-W. L. Stone's Cherokee Dev. Co. 1, A. J. Acker sur, 2 mi e Maydelle, dk.

DALLAS COUNTY—Mauldin Oil Co.'s W. E. Howell 1 (107-ac), S. Layton sur, 8 mi e Grapeland, sd 540 ft.

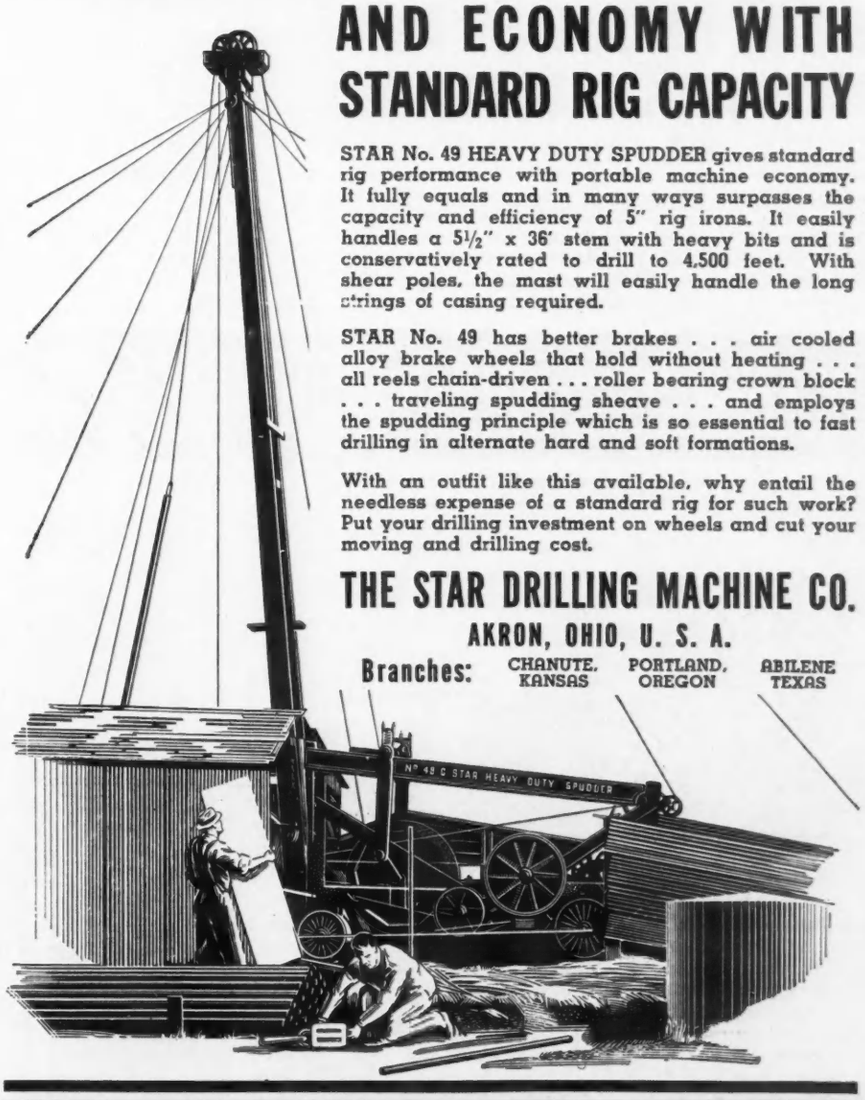
DELTA COUNTY—O. W. Killam et al's Delta Farming Assn. 1, J. Dollahite sur, 4 mi ne Sulphur Bluff, elev 348 ft, top Woodbine 2712 ft, sd 2920 ft.

FRANKLIN COUNTY—Stroube & Stroube's United Banks 1, nec tract, J. Bowman sur, 3 mi se Hagansport, Paluxy test, cem 10-in cas 110 ft.

GREGG COUNTY—Humble-Gulf's E. D. Robertson 1 (11.4-ac), M. Mann sur, 2½ mi w

SPUDDER EFFICIENCY

AND ECONOMY WITH STANDARD RIG CAPACITY



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STAR No. 49 has better brakes . . . air cooled alloy brake wheels that hold without heating . . . all reels chain-driven . . . roller bearing crown block . . . traveling spudding sheave . . . and employs the spudding principle which is so essential to fast drilling in alternate hard and soft formations.

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STAR DRILLING MACHINES

by s of Longview, 4 mi e production, elev 272 ft, Austin chalk 3202-3341 ft, top Georgetown lime 3341 ft, top Paluxy 4541 ft, top first Glen Rose 4876 ft, top anhydrite stringer 5617 ft, massive anhydrite 6214-6532 ft, top Travis Peak 7325 ft, coring 7395 ft.

HENDERSON COUNTY—E. B. LaRue et al's Breedlove-Mills 1 (232½-ac), J. Dunn sur, 5 mi nw LaRue, elev 485 ft, mim and sd titles. Sherman Hunt, DeArman & McMillan's A. R. Dillard 1 (840-ac), H. Jeffrey sur, 9 mi sw Mabank, elev 361 ft, top Woodbine 3093 ft, top Georgetown 3720 ft, top Paluxy between 4689-99 ft, top Travis Peak 6429 ft, td 6518 ft, pb to 3138 ft, gun-perforated cas opposite Woodbine at 3095-3105 ft with 29 shots, completed flows 128 bbls 44.8 gravity oil daily 3/16-in choke. Wm. McDougal, Tr. et al's Trinity Farm Securities Co.-R. M. Manning 1 (200-ac), H&TC Ry. sur, 4 mi s Malakoff, dk. Tide Water Associated-Seaboard & Humble's McElreath-Suggett 2-C (149-ac), W. P. Wyche sur, 1¼ mi nw Opelika, elev 452 ft, top Georgetown 5070 ft, top Paluxy 6087 ft, top first Glen Rose 6282 ft, top anhydrite 6991 ft, massive anhydrite 7315-7713 ft, flowed water at 7830 ft, top Pettit 8510 ft, top Travis Peak 9073 ft, td 9320 ft, pb to 8890 ft, gun-perforated cas 68 shots 8759-8890 ft, flowed 63 bbls 55 gravity distillate, plus 6 percent wash water and mud, 19 hrs on ½-in choke, with 8,000,000 ft gas.

HOPKINS COUNTY—Abbott & Rutland's Peyton 1-A, J. Burkham sur, 2 mi n Sulphur Bluff, elev 355 ft, top Woodbine 2884 ft, top Georgetown 3348 ft, dr 3620 ft.

LIMESTONE COUNTY — Pure Oil Co.'s Kendrick 16-T (96-ac), 3 mi w Mexia and in field, elev 508 ft, top Woodbine 2896 ft, top Georgetown 3365 ft, top first Glen Rose 4270 ft, top broken anhydrite 5132 ft, Travis Peak series 5656-7676 ft, fsh drill pipe in lower Marine, td 8847 ft. Stanolind O&G Co.-Ramsey Pet. Corp.'s T. Norris 1 (40-ac), K. Thrasher sur, 5 mi n Kosse and on Thornton fault, elev 528 ft, Austin chalk 2791-2890 ft, top Woodbine 2980 ft, top Georgetown 3255 ft, top first Glen Rose 4026 ft, top first anhydrite 4886 ft, top Pettit 5375 ft, top Travis Peak 5523 ft, dr hard sand 6565 ft.

NAVARRO COUNTY — Nowlin, W. W. Lechner & J. S. Hudnall's Easterling 1 (209-ac), J. Mayor sur, 2 mi s Chatfield, elev 450 ft, top Austin chalk 1512 ft, dry and abd in water sand 2663 ft. Mrs. Jane Robinson et al's Fortsan Bros. 1, Eli Smith sur, 5 mi ne Corsicana, elev 345 ft, top Austin chalk 1346 ft, dr 1575 ft. Tom Sharp et al's E. B. McDowell 1 (65-ac), T. J. Jordan sur, ½ mi s Bazette, Pecan chalk 1980-2005 ft, Austin chalk 2835-2935 ft, fsh 2970 ft.

UPSHUR COUNTY — L. & G. Oil Co.'s Henry Williams 1 (315-ac), L. S. Von Roeder sur, 2 mi nw Gracetown, elev 304 ft, rig. J. K. Wadley et al's W. R. Thornton 1, P. Maulding sur, 3 mi sw Gracetown, elev 277 ft, Pecan chalk 2616-3130 ft, top Austin chalk 3652 ft, top Woodbine 3762 ft, sand to 3774 ft, top Georgetown lime 3870 ft, dry and abd 3890 ft.

EAST TEXAS BORDER COUNTIES

HARRISON COUNTY—Ark. Fuel Oil Co.'s (Cities Service) C. M. Abney 1, Eason Wilson sur, spd dr 750 ft (Trinity test). Eastern Shreveport Oil Co.'s Mable George 1, J. S. Powell sur, wosr, td 2905 ft.

PANOLA COUNTY—Danciger O&R Co.'s J. W. Tatum 1, Alfred Bissell sur, massive anhydrite 4880-5175 ft, 5-3/16 in csg 6350 ft, sd td 6514 ft. Magnolia Pet. Co.'s E. A. Hull 2, Thos. Applewhite sur, elev 222 ft, top Travis Peak 6024 ft, top lower Marine 8078 ft, arr pb to 6100 ft, old td 8718 ft. C. K. Crews' J. C. Graves 1, McGowan sur, mim.

SHELBY COUNTY—Allen et al's George 1, C. C. Tutt sur, sd 2950 ft. C. L. Cope's Pickering Lbr. Co. 1, Stephen English sur, rur. Portex Oil Co.'s Pickering Lbr. Co. 3, A. Hanson sur, rur. Redditt & Gray's Pickering Lbr. Co. 2, S. O. Pennington sur, rur. D. S. Ring's Windham 2, Jas. English sur, mim.

WEST TEXAS

(This report is confined to the north portion of the Permian basin.)

ANDREWS COUNTY—Gulf Oil Corp.'s University 1-G, ne ne nw sec 8, blk 14, elev 3208 ft, top anhydrite 1700 ft, gas blowout in Yates sand 2997 ft, dr 4275 ft. Honolulu Oil Corp.'s J. E. Parker 1-6, ne ne nw PSL sec 6, blk A-44, mim.

BAILEY COUNTY—Geo. Etz & E. H. Robertson's I. C. Enochs 1, c labor 66, blk 182, Floyd C. S. L. sur, elev 3788 ft, dr 3430 ft.

BORDEN COUNTY—Continental Oil Co.'s Clayton & Johnson 1-A, NWc of T&P Ry. sec 27, blk 32, T-4-N, elev 2534 ft, dr 1805 ft.

COCHRAN COUNTY—Devonian Oil Co.'s T. B. Duggan 1, NWc labor 11, league 55, Oldham C.S.L. sur, elev 3680 ft, top anhydrite 2160 ft, top Yates 2880 ft, top first lime 3820 ft, top solid lime 4180 ft, pay 4998-5044 ft, reacidized 1500 gals, testing 19 bbls oil per hr. J. R. Meeker et al's Mrs. D. Slaughter Wright 1, NWc sw¼ labor 26 league 96, Mills C.S.L. sur, rur. P. N. Wiggins Jr., C. Ed. Hyde et al's C. S. Dean-Slaughter (Honolulu) 1, NEc league 58, Martin C.S.L. sur, elev 3686 ft, dry and abd in sul w 5070-5085 ft; C. S. Dean-Slaughter 1, labor 26, league 92, Lipscomb C.S.L. sur, elev 3730 ft, top anhydrite 2270 ft, top Yates 2858 ft, top lime 4220 ft, broken pay 5004-5020 ft, acidized and shot, co with 4000 ft oih.

DAWSON COUNTY—Ray Albaugh et al's Higginbotham 1, labor 24, league 269, Moore C.S.L. sur, lcn.

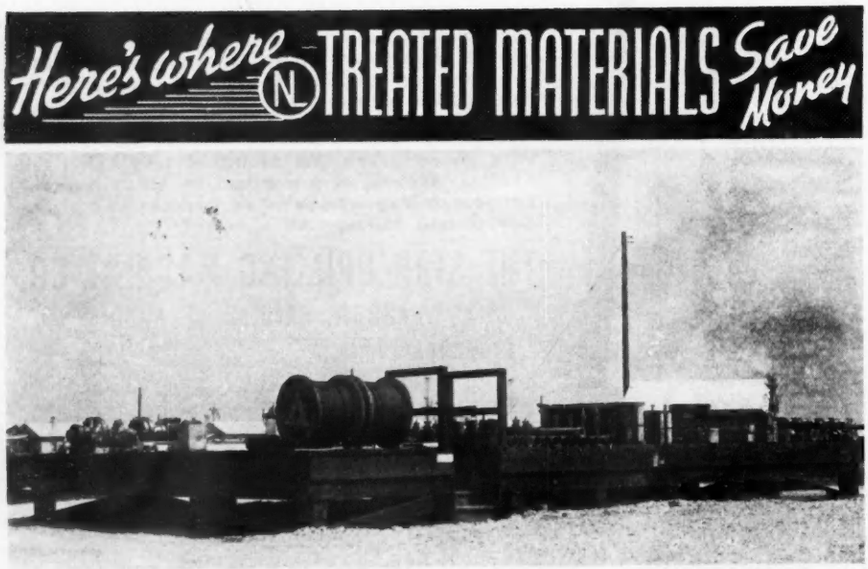
GAINES COUNTY—Amerada Pet. Corp.'s S. J. Averitt 1, c se ne of W.T. Ry. sec 228, blk G, elev 3323 ft, top anhydrite 1990 ft, dr plugs, td 4900 ft. American Liberty Oil Co.'s W. N. Willard 1, SWc of PSL sec 38, blk AX, dr 2200 ft. Amon G. Carter et al's E. C. Brand 1, SEc PSL sec 54, blk AX, lcn; E. C. Brand 2, NEc se¼ sec 54, top anhydrite 2145 ft, dr 4700 ft; G. M. Langdon 1-A, nw nw ne PSL sec 43, blk AX, flowed 20 bbls hourly after acid at 4980 ft, sd to reacidize. Amon G. Carter, Continental & Plymouth Oil Co.'s H. Giesecke 1, NWc labor 1, league 296, Reagan C.S.L. sur, elev 3115 ft, cem 9 in csg 2119 ft, sd 2130 ft acct. titles. Continental Oil Co.'s E. H. Jones 2, c se ne PSL sec 1, blk A-8, elev 3632 ft, top anhydrite 2011 ft, top salt 2060 ft, top Yates 2990 ft, top brown lime 4646 ft, dr 4740 ft; A. L. Wasson 1-B-53, NEc se¼ PSL sec 53, blk AX, dr 2740 ft. Conoco-Amon G. Carter's A. L. Wasson 2, NEc PSL sec 48, blk AX, dr 2870 ft; Wasson 3, SEc sec 48, dr 1960 ft; Wasson 4, SWc sec 48, run 7 in csg 2105 ft. Humble's T. S. Riley 1, NEc sec 381, blk G, CCSD&RGNG Ry. sur, top anhydrite 2120 ft, td 4995 ft, used 7000 gals acid, testing. Mitchell & Sullivan's T. S. Riley-Shell 1, c ne ne sec 447, blk G, CCSD&RGNG sur, elev 3533 ft, dr 3690 ft. Shell Pet. Corp.'s R. A. Cox 1, NEc sec 380, blk G, CC&SDRG&NG Ry. sur, top anhydrite 2040 ft, dr 4880 ft; Robertson 1, near NWc ne¼ sec 344, blk G, cem sur csg. Wm. F. Hannigan et al's P. C. Dunbar-Stanolind 1, sw¼ PSL sec 24, blk A-12, lcn.

GARZA COUNTY—M. L. Richards et al's J. B. Slaughter 1, se se se of T. T. Ry. sec 5, blk 8, elev 2870 ft, dr 1935 ft.

HOCKLEY COUNTY—The Texas Co.'s Bob Slaughter Blk 2 (6219-ac), SEc labor 92, Zavalla C.S.L. sur, league 37, elev 3531 ft, top anhydrite 2222 ft, dr 4569 ft.

MARTIN COUNTY—J. L. Greene, R. C. Conkling & T. R. Parker's O. B. Holt 1, labor 20, league 319, Garza C.S.L. sur, elev 2907 ft, top anhydrite 2050 ft, top salt 2070 ft, top Yates 2990 ft, salt w at 4109-25 ft, dr 4355 ft. Harris-Anderson Corp.'s Mrs. M. Robinson 1, c sw¼ of T&P Ry. sec 33, blk 36, T-1-N, rur.

YOAKUM COUNTY—American Liberty Oil Co.'s C. A. Thomas 1, near NWc sw¼ sec 864, blk D, J. H. Gilbson sur, top Yates 2975 ft, dr 4600 ft. Denver Producing & Ref. Co.'s J. A. Whittenburg 1-A, c nw nw sec 830, blk D, J. H. Gibson sur, elev 3619 ft, sat lime pay 4935-5038 ft, flowing after second acid job rate 561 bbls daily; Whittenburg 2-A, c ne nw sec 830, rig; Whittenburg 2, c ne ne sec 381, blk D, elev 3623 ft, dr 4115 ft. J. L. Greene et al's L. B. Nevels-Standard 1, NEc se¼ sec 709, blk D, elev 3695 ft, top anhydrite 2180 ft, top Yates 3120 ft, top brown lime 4100 ft, top solid lime 4630 ft, dry and abd, no water, 5501 ft. Honolulu Oil Corp.'s R. E. Bennett 2, ne se ne sec 677, blk D, J. H. Gibson sur, dr 4920 ft. J. W. Murchison & L. Fikes' C. A. Elliott 1, c ne ne sec 832, blk D, elev 3613 ft, top anhydrite 2120 ft, top Yates 2910 ft, top solid lime 4450 ft, pay 4955-5070 ft, acidized twice, complete flowed 235 bbls 35½ gravity oil initial; M. B. Sawyer 1, c sw se sec 702, blk D, rur. Phillips Drl. Co.'s W. A. O'Brien 1, NEc sec 441, blk D, lcn. E. H. Pitkin & Lou Stogner's Blades 1, c ne ne sec 103, blk D, cem sur csg. Producers Investment Corp.-American Liberty Oil Co.'s L. N. Clawater-Amerada 1, c sw sw sec 766, blk D, elev 3617 ft, top anhydrite 2190 ft, base salt 2845 ft, top brown lime 4010 ft, top solid lime 4465 ft, pay 5020-83 ft, used acid, completed flowed 224 bbls, 32.2 gravity oil initial. Shell Pet. Corp.'s Geo. Baumgart 1, 440 ft fr w & 1320 ft fr s lines sec 828, blk D, elev 3587 ft, top anhydrite 2200 ft, top Yates 3020 ft, dr 4870 ft; Bennett 1, ne se ne sec 677, cem csg 346 ft; Lynn 1, c sw sw sec 798, rur. Skelly Oil Co.-Sun Oil Co.'s J. A. Kiser 1, c ne ne sec 640, blk D, elev 3657 ft, top anhydrite 2183 ft, base salt 2890 ft, top Yates 2980 ft, top brown lime 4045 ft, top solid lime 4540 ft, filled 300 ft oih at 5276-84 ft, dr 5284 ft. Standard Oil Co. of Texas' M. B. Sawyer 1, c se se sec 576, blk D, elev 3669 ft, top lime 4590 ft, shot 1000 qts, nitro 5190-5400 ft, td 5403 ft, swabs 4 to 9 bbls fluid hourly 50 percent oil. T. P. Coal & Oil Co.'s Bennett 3, SWc nw¼ sec 678, blk D, mim. P. N. Wiggins, Jr. et al's Bartlett 1, NEc sec 359, blk D, elev 3780 ft, top anhydrite 2320 ft, top gray lime 4558 ft, dr 5150 ft.



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SOUTH TEXAS

SAN ANTONIO DISTRICT

ATASCOSA COUNTY—L. W. Stieren's T. A. Crawford 1, J. O. Crawford sur 69, swabbing 3476 ft.

BASTROP COUNTY—J. W. Bibb et al's O. B. Lentz 1, F. Wilkinson sur, dr 2387 ft. Hantho-Nelson's K. M. Litton 2, Addison Litton sur, sd for wtr, 1935 ft.

CALDWELL COUNTY—Heard & Heard's R. E. Brown 1, P. B. McCearley sur, abnd 2695 ft. Grady Kraft's A. M. Cardwell 1, Pablo Martinez sur 9, lcn. McNeill Pet. Co.'s F. Marino 1, Isaac Allen sur, flowing 5 bph, 18 grav. crude (looks dead), in 12 hrs flowed 62 bbls oil. I. H. Wilson's C. A. Alexander 1, D. Benton sur, testing oil show, 7 in at 1800 ft, top Austin chalk 1810 ft.

DIMMITT COUNTY—Teas and Maryland Corp.'s S. E. McKnight 1, I&GN sur, fshg 4662 ft.

EDWARDS COUNTY—Dan Auld et al's L. K. Henderson Est. 1, HE&WT sur, dr 1780 ft. Amon G. Carter et al's Frank J. Sweeten ranch 1, GC&SF sur, milling 5110 ft. Evans & Love's Steve Brown 1, GWT&P sur, co to dd.

FRIO COUNTY—Amerada's R. Melms 1, N. C. Alexander sur, ran 7 in 3890 ft, wocs.

GONZALES COUNTY—W. B. Osborne's Wells Ranch 1, sec 8, Wells Ranch subd, dr 1365 ft.

GUADALUPE COUNTY—T. H. Coulter's A. Engelke 1, Harriet Cottle sur, junked and abnd 2012 ft. Housel Oil Corp.'s N. J. Carter 2, S. Highsmith sur, testing 2315 ft, top A/C 2115 ft. Mehu Oils, Inc.'s Wm. F. Schulze 1, Felix Chenault sur, sd, may deepen from 1620 ft. Riddle Oil Co.'s C. A. Krueger 1, J. M. Thompson sur, dr 710 ft. Wellington Oil Co.'s Albert Koepp, abnd 1800 ft.

MILAM COUNTY — Kingdorr Exploration Co.'s M. Stidham et al 1, J. P. Jones sur, abnd 3816 ft.

WILSON COUNTY—Pattico Oil Co.'s Mrs. B. Keller 1, Karnes County School lands sur, lcn. W. A. Richardson Pet. Co.'s E. M. Hierholzer 1, R. Salinas sur, abnd 1265 ft.

ZAVALA COUNTY—H. F. Wilcox O&G Co.'s T. J. Gilliam 2, GWT&P sec 11, coring 2920 ft.

CORPUS CHRISTI DISTRICT

BEE COUNTY—J. R. Dougherty's Fee 1, P. Carroll sur, comp no gauge, td 3670 ft.

BROOKS COUNTY — Standard of Texas' Mestina O&G Co. 10 (lse. 1), R. G. Salinas sur, coring 2920 ft; Mestina O&G Co. 3 (lse. 2), R. G. Salinas sur, lcn.

DE WITT COUNTY—Trinity Pet. Co.'s C. D. Bolting 1, R. Galletty sur, rig to be mi 11-22-37.

GOLIAD COUNTY—Goliad Oil Co.'s S. E. Cole 1-A, lot 33, perf 5584-96 ft, swabbed, failed to kick in, ran elec. formation tester. Rual B. Swiger et al's Carrie Wood 1-B, J. Shearn sur, coring below 4875 ft.

HIDALGO COUNTY—Atlantic's McCalip 1, sec 175, dr plugs 8505 ft. Gulf States' Delta Orchards 2, sec 94, dr 6135 ft. Y and B Oil Co.'s Waite Bros. 1, sh 382, ran elec. formation tester 5558 ft, now mir to dr 8000 ft.

JACKSON COUNTY—Hargrove & Crosby's Hodges 1, La Ward Farms sur 7, dr 6107 ft. Sam G. Harrison's H. A. Meyer 1, M. L. York sur, dr 2145 ft.

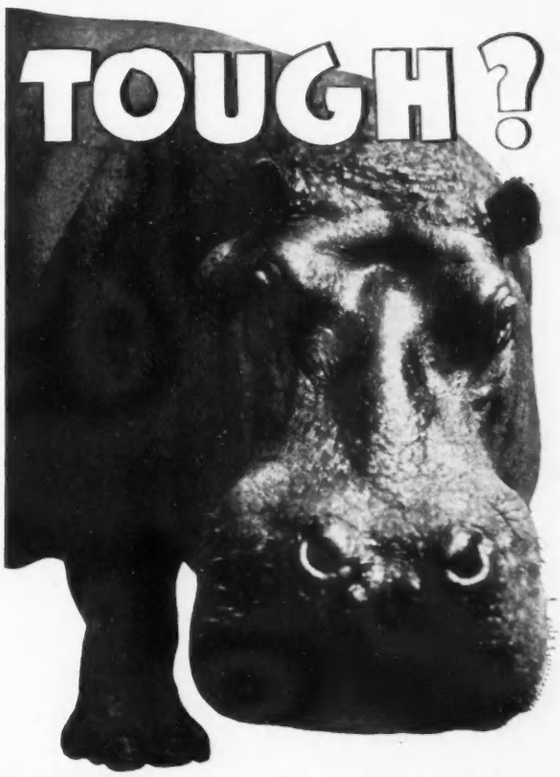
JIM WELLS COUNTY—H. M. Hill et al's B. Kuether 1, SK&K sur, dr 2870 ft. H. H. Howell et al's J. R. Talbert Est. 1, La Vaca gr, cem back, swabbing, oil mud and wash wtr, perf 3602-09 ft. Magnolia's A. A. Seeligson 7, Los Jaboncillos sur, perf 6713-23, dst rec hole full sw, recemented, woc, pb 6708 ft from 8165 ft. H. J. Porter's Chas. Wolcott 1, W. H. Sartain & Co. subd, dr 1935 ft. Smith & Storey, Inc.'s J. C. McGill 2, N. Guessett sur 98, spudded. Yukon Oil Co.'s Mrs. R. Schaefer 1, Z. Cuellar sur 11, dr 4054 ft.

KENEDY COUNTY—Sal Vieja Oil Corp.'s Garcia Land & Cattle Co. 1, sh 59, dr 6830 ft.

KLEBERG COUNTY—Cinco Oil Co.'s J. W. Kellam 1, KT&I subd, ru. Magnolia's Anton Dietz 1, sec 7, spudded. Superior Oil Co.'s Theo. W. Koch 1, blk 32, dr 5135 ft.

LIVE OAK COUNTY—James B. Chew and Hantho-Nelson, Inc.'s A. McNeill Bell 1, A. Parks sur, mir. L. Franklin's L. Odem 1, R. Everett sur, abnd 2032 ft. C. G. Grimes' W. A. Friedle 1, Refugio School Land sur 6, spudded. Charles Hannah's C. H. Wedding 1, B. Haughy sur, abnd 1810 ft. Holland Oil Co.'s Alamo Lumber Co. 1, J. Poitevent sur 99, dr abt 1500 ft. Ranco Oil Corp.'s Fee 1, J. Poitevent sur 3, dr 1015 ft. Reynosa Oil Co.'s W. O. Nichols 1-A, S. Ryan sur, coring 942 ft.

NUECES COUNTY—Culton & Meaders' J. L. Bailey Est. 1, blk 65, dr 6013 ft. Richardson's J. O. Chapman et al 1, sec 43, ru; Bertha Cunningham 1, sec 77, comp reported to be gasser with oil spray, tp 460, cp 1100 lbs., perfs 4084-88 ft. Sannix Oil Co.'s E. Nesloney 1, Casa Blanca gr, dr 5575 ft. Southern Minerals Corp.'s R. King 2, blk 6, comp snd 4017-



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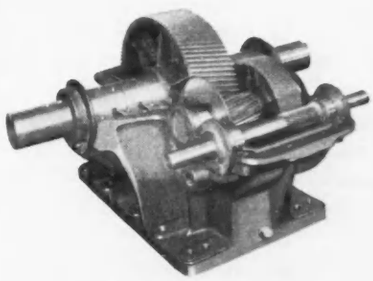

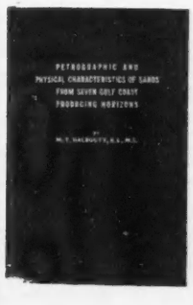

PETROGRAPHIC AND PHYSICAL CHARACTERISTICS OF SANDS FROM SEVEN GULF COAST PRODUCING HORIZONS
By M. T. Halbouty, B.S., M.S.,
Merit Oil Corp.

The material printed in this book was first published in The OIL WEEKLY in a number of installments, extending over a seven-week period. Because of the widespread interest and demand for copies, it is being presented in book form for the benefit of those who may wish to study or continue the research work of M. T. Halbouty, the author.

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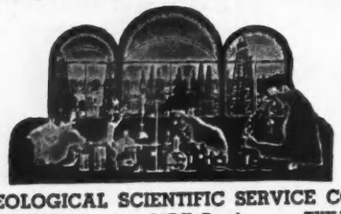
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35 ft, 7 in at 4060 ft, flowed 21.39 bbls oil 7 hrs via gas lift, tp 150 and cp 850 pounds, est. 200 bpd of sw, td 6219 ft. Union Prod. Co.'s C. L. Galladay et al 1, Agua Dulce gr, sd 4670 ft; A. B. Simmonds 1, Agua Dulce gr, dr 6025 ft.

REFUGIO COUNTY—Hogan Oil Co.'s J. S. Kelley 1, J. Power sur, coring 5910 ft.

SAN PATRICIO COUNTY — Argo Oil Corp.'s A. Soehnge 1, P. J. & M. Delgado gr, swabbing 6310 ft. Pat Rutherford's W. T. George 1, R. Saddler & J. Garcia surveys, dr 2875 ft.

VICTORIA COUNTY—W. V. Bowles & Co.'s D. L. Robertson Est. 1, T. C. Burnham sur, dr 5715 ft. Gulf's Mahon & Buehler 1, J. Poitevent sur, dr 7535 ft. Stanolind's Henderson & Pickering, E. Benavides sur, coring below 7468 ft, rec ds.

WILLACY COUNTY — Magnolia's F. Armendiaz 1, San Juan de Carricitos gr, dr below 7110 ft. Shell's Yturria Cattle Co. 2, San Juan de Carricitos gr, dr 8265 ft.

LAREDO DISTRICT

DUVAL COUNTY—J. L. Collins & Co.'s E. R. Hagist 1, BS&F sur 267, dr 1625 ft. F. A. Gillespie & Sons' Hamilton Ranch 1, J. Poitevent sur 85, lcn. Frank J. Gravis' F. Vaello et al 1-A, San Andres gr, coring ahead 4790 ft; R. Schallert 1, sur 239, cored 3220 ft, reaming to run 1000 ft of 10 in, prep to dr deep test. John H. Hougen, Tr.'s W. H. Patton, tr 1, sur 148, dr 3901 ft. Magnolia's DCRC 1, BS&F sur 261, abnd 3725 ft. John J. O'Hern's Maria B. Volpe 1-G, sur 170, abnd 3193 ft (ow dd). Rudco.'s K. L. Ellis 1, GC&SF sur 308, coring 2335 ft. Slaughter & Hugle's J. B. Hunter Est. 1, J. Poitevent sur, prep to abnd 4732 ft. Wellington's J. F. Welder Heirs 8-D, sur 381, testing 1720 ft, wtr broke in, may make another squeeze job.

JIM HOGG COUNTY—Darby Pet. Co.'s R. Holbein 1-C, sec 20, lcn.

McMULLEN COUNTY — Gilcrease O&G Co.'s A. C. Miles 1, Charles Stephens sur, abnd 2737 ft. C. C. Shumway's Shiner Ranch 12, G. J. Goode sur, mim.

STARR COUNTY—J. L. Collins & Co.'s A. Guerra 1, sh 6, dr 5860 ft. Sun's H. P. Guerra 1-F, por 109, coring 3085 ft. Transwestern's T. B. Slick School 1, sur 266, pumping oil in well, trying to obtain returns, td 6860 ft.

WEBB COUNTY—Mills Bennett Prod. Co.'s A. E. Gates 1, W. A. Cavitt gr, abnd 2813 ft; A. E. Gates 2, CCSD&RGNG RR sur, mim. O. W. Killam's A. M. Bruni Est. 4, sur 585, dr 515 ft. Kirkwood & Morgan's Garcia & Villareal 1, sur 720, dr 57 ft. Lemp Oil Co.'s N. H. Clark 1, por 33, dr 1005 ft. C. H. Lewis' C. G. de la Garza 1, sec 48, stdg, woo 2116 ft. J. R. B. Moore & Paul L. Meaders' Garcia & Villareal 1, sur 338, coring 1919 ft. G. G. Mortimer's Welhausen (Frost) 1, CC SD RG NG RR sur 73, lcn. Randon Oil Co.'s Schott & Killam 1, sur 471, abnd 1810 ft.

TEXAS GULF COAST

BRAZORIA COUNTY — Pure's Smith 1, Peach Point prospect, S. F. Austin sur, dr shale 6114 ft.

CHAMBERS COUNTY—Ingot & Merit Oil Co.'s Wright 1, Cedar Bayou area, C. Smith sur, testing 6433 ft.

COLODARO COUNTY—O. C. Garvey's B. Ernest 1, n of Eagle Lake, M. Lapham sur, dr shale 4050 ft.

GALVESTON COUNTY—Sun's Cade & Co. 1, Bolivar prospect, A. Dickson sur, lcn.

FT. BEND COUNTY — Chapman Minerals Corp.'s Sugarland Industries 1, s of Sugarland, G. Brown sur, dr shale 6378 ft.

HARDIN COUNTY—J. G. Mayo et al's Haden 1, Bragg area, W. K. Griffin sur, dr shale 3407 ft.

HARRIS COUNTY — H. C. Cockburn's White 1, Houston Ship Channel, Harris & Carpenter sur, dr shale 5009 ft.

JEFFERSON COUNTY—J. E. Harwell's State 1, in Gulf of Mexico, Block 720, driving piling. G. H. McCarthy's Broussard Trust 1, Little Pine Island area, C. Hillibrandt sur, dk. Shell's McFaddin 1, McFaddin Ranch area, S. A. Pace sur, coring sand 5408 ft.

LIBERTY COUNTY—Humble's Moore 1, Devers area, M. Whittington sur, dr salt water sand 5122 ft.

MATAGORDA COUNTY—Sun's Robbins 1, n of Citrus Grove, C. H. Vandeveer sur, dr shale 5780 ft.

POLK COUNTY — National Standard Oil Co.'s Carter Brothers 1, n of Segno, M. S. Womack sur, mim.

WALLER COUNTY—J. Bryan Eby et al's Rice 1, Waller prospect, J. H. Stephenson sur, dr shale 6340 ft.

WHARTON COUNTY—Texas Co.'s Johnson 1, Hillje prospect, J. Bognal sur, dr shale 429 ft.

WYOMING

ALBANY COUNTY—Ohio Oil Co., Griffin 1, csw se sw 2-21n-77w, dr 3376 ft.

CARBON COUNTY — Superior Oil Co., Christensen 1, nw nw 7-12n-92w, 2080 ft.

FREMONT COUNTY—Stanolind Oil & Gas Co., Johnson 1, cse se 3-33n-96w, dr 4769 ft.

HOT SPRINGS COUNTY—J. W. Bales & Son Government 1, w½ se sw 28-43n-93w, mim.

NATRONA COUNTY—General Petroleum Corp., Government 1, nw nw se 21-35n-77w, dr 4400 ft.

SWEETWATER COUNTY—Mountain Fuel Supply Co., Williams 1, ce½ ne 5-12n-95w, 5680 ft; Mountain Fuel, Hay 1, ne se nw 2-19n-110w, dr 2184 ft.

MONTANA

ROOSEVELT COUNTY — Poplar Dome Syndicate's Fry 1, nw nw ne 21-28n-50e, dr 1400 ft.

TOOLE COUNTY — Montana Gas Corp., Clark 2, csw sw 24-37n-1w, wocs 8⅝ in csg 2103 ft.

YELLOWSTONE COUNTY — Broadview Dome Oil Co., Halbritter 1, ne ne sw 18-3n-23e, dr 3510 ft.

Rope Fastening

"The Importance of Thoroughly Dependable Wire Rope Fastenings." The American Hoist & Derrick Company has issued an attractively illustrated booklet covering the use of its Crosby Wire Rope Clip.

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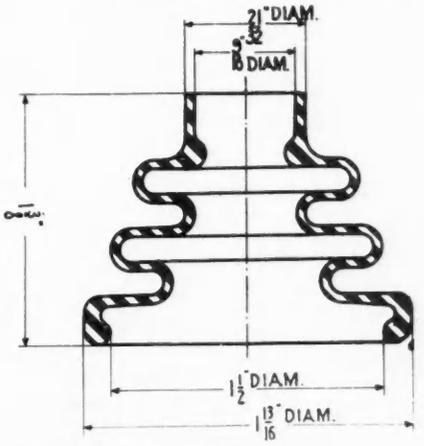
FLEXIBLE TYPE COUPLING
B. H. Pierce Manufacturing Company

follows: the gears are nickel steel, specially heat treated; a flexible type coupling for plain-end pipes. The coupler, shown in cross section in the accompanying illustration, permits substantial changes in alignment and takes care of expansion and contraction in a pipe line. The construction is such that the pressure of the water or other fluid is utilized in holding the joint tight against leakage.



Pierce Flexible Type Coupling for Plain End Pipes

With the couplers, a pipe line can be assembled as fast as it can be placed in position and without tools of any kind, it is claimed. For use on water lines, the gaskets used are made of a live rubber composition. For lines used for oil, gas and certain chemicals the manufacturers use gaskets made from a neoprene compound. This material exhibits resilience, elasticity, strength, and abrasion resistance. It maintains its original properties virtually unchanged even after extended exposure to oils, chemicals, heat, and sunlight, the manufacturer states.

PLUNGER PUMPS
Mid-Continent Pump Supply Company

Mid-Continent Pump Supply Company, Tulsa, is distributing a new type of insert liner pump, known under the trade name "Oil States," which has recently been developed by Pacific Pump Works.

This pump was primarily designed to increase the flow and volume of fluid through the tubes and mechanism by applying the principle of streamlining. According to the manufacturer, the pump meets the requirements of viscosity and temperatures with greater ease, greater recovery, and greater constancy.

DIESEL ENGINES
Hercules Motors Corporation

Hercules Motors Corporation, Canton, Ohio, announces a new line of four-cylinder Diesels known as the "DOO" series.

Of compact design, the "DOO" series has been developed particularly for use in commercial vehicles of smaller and more popular sizes as well as for a wide variety of industrial, agricultural, oil field and marine applications. Three models of the new series have been produced. The smallest, the "DOOB" has a bore of 3¾ inches and a stroke of 4½ inches, with the total piston displacement of 198.8 cubic inches. The "DOOC" has a bore of 4 inches and a 4½-inch stroke, with 226.2 cubic inches displacement, and the "DOOD" has a 4¼-inch bore and a 4½-inch stroke, with a 255 cubic inch displacement. The "DOOB" is rated at 62 H.P. and the "DOOC" at 70 H.P. at an engine speed of 2600 R.P.M. At 1600 R.P.M. the "DOOD" develops 56.5 H.P.

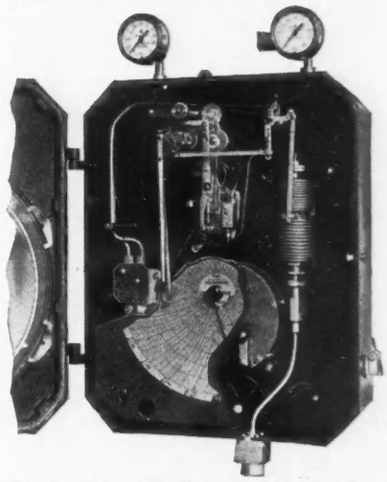
Engines of the new series are interchangeable from an installation standpoint with the extensively used Hercules "OO" series of gasoline engines.

The series of Hercules "DOO" Diesels is available in power unit form, either fully enclosed or in the open type of assembly.

PRESSURE INSTRUMENTS
Taylor Instrument Companies

The Taylor Instrument Companies, Rochester, New York, have just announced a line of instruments for indicating, recording and controlling absolute pressure.

The absolute pressure element consists of a flexible phosphor-bronze bellows to the inside of which the pressure medium under measurement is communicated. Connected with this assembly, and opposing its action, is a second identical metal bellows which has been evacuated and sealed, thus comprising an atmospheric-pressure compensator.



Taylor Absolute-Pressure Controller

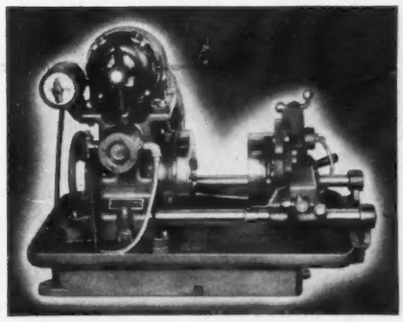
These instruments are applicable to distillation units, evaporators, condensers, and in general, wherever the corresponding mercury type of gauges can be used—with the exception of course, of gases or vapors corrosive to the bronze bellows.

PORTABLE PIPE MACHINES
Oster Manufacturing Company

Oster Manufacturing Company, 2057 East 61st Place, Cleveland, Ohio, recently announced the development of a new portable pipe machine, known as No. 512-A "Tom Thumb."

This model rounds out a line of ½-inch to 2-inch machines.

The die-head is of the front-cutting type which, together with the machine's "close-grip" front chuck, makes it possible to handle pieces as short as 2½ inches without using a nipple chuck. The size setting marks are on top of the head, where they are plainly visible for easier, more accurate settings. An internal oiling system to the dies and cut-off tool is provided. A flexible hose, carries the oil from the oil pump to the intake valve in the die-head, and the flow of oil is controlled by a two-



Oster No. 512-A "Tom Thumb" Portable Pipe Machine

way thumb valve conveniently located for the operator.

The holder for the cut-off and reaming and chamfering tools is operated in a heavy block by a large ball-crank. This rectangular tool holder eliminates twist and breakage of tools.

The steady rest is operated by a ball crank.

Overall length of the new machine is 34 inches, width 21 inches, height 24 inches, and its net weight 375 pounds.

ELECTRIC DRILLS

The Stanley Works

The Stanley Works, New Britain, Connecticut, announces development of new 3/16-inch electric drills designed for production work where a light weight, quality drill is required. These new drills, only 2¾-inch in diameter, permit close quarter drilling, due to compact design. They are available in three different speeds for fast drilling in either metal, wood or other materials.

Stanley No. 362 and 362H Electric Drills

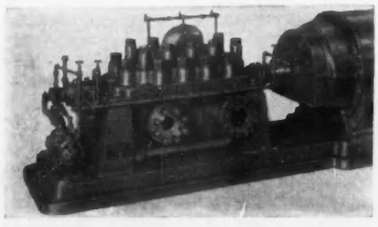
The features of these new drills may be summed as folows: the gears are nickel steel, specially heat treated; full ball bearings are provided; the housing is made of strong aluminum alloy; the No. 362 type has an "On" and "Off" switch mounted in the rear end bell, and the No. 362H has an automatic pistol type handle and fully enclosed double-pole switch mounted in the handle. No. 462 is similar to No. 362 with ¼-inch capacity and the No. 462H is similar to No. 362H with ¼-inch capacity.

MULTI-STAGE PUMP

Allis-Chalmers Manufacturing Company

Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, has recently introduced an improved design of multi-stage pump into the high-pressure pump field.

This pump is called the "Doubleton" type because of the use of double-suction impellers, and the double balance of the rotating element. The double-suction impellers provide axial balance and the positions of the successive volute passages which surround each impeller are made so as to largely equalize unbalanced radial forces on the impellers. These pumps are made with horizontally split casings for pressures 1500 pounds and above. The design and bolting has been so worked out, based on the company's experience with bolting high-pressure, high-temperature steam-turbine casings, that no difficulty is experienced in maintaining a tight joint and retaining the advantages of the split-casing construction. This pump is suitable for high-pressure applications such as oil pipe lines, boiler feed service, etc.



Allis-Chalmers "Doubleton" Multi-Stage Pump

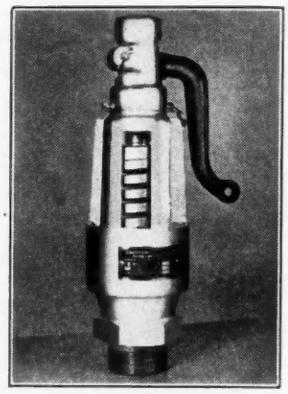
SAFETY VALVES

Johnson Manufacturing Company

Johnson Manufacturing Company, Box 433, Shreveport, Louisiana, recently announced the development of a new line of safety valves, which are made of certified malleable iron, having a tensile strength almost equal to cast steel.

The spring cage is made with ribs so that the spring will be exposed to full view at all times for inspection. If the spring should become fully compressed on a safety valve, the valve would be practically the same as a bull plug, instead of a safety valve, and such danger could be noticed immediately with this safety valve.

These safety valves are recommended for pressures up to 500 pounds, and valves at any pressure from 20 to 500 pounds can be furnished.



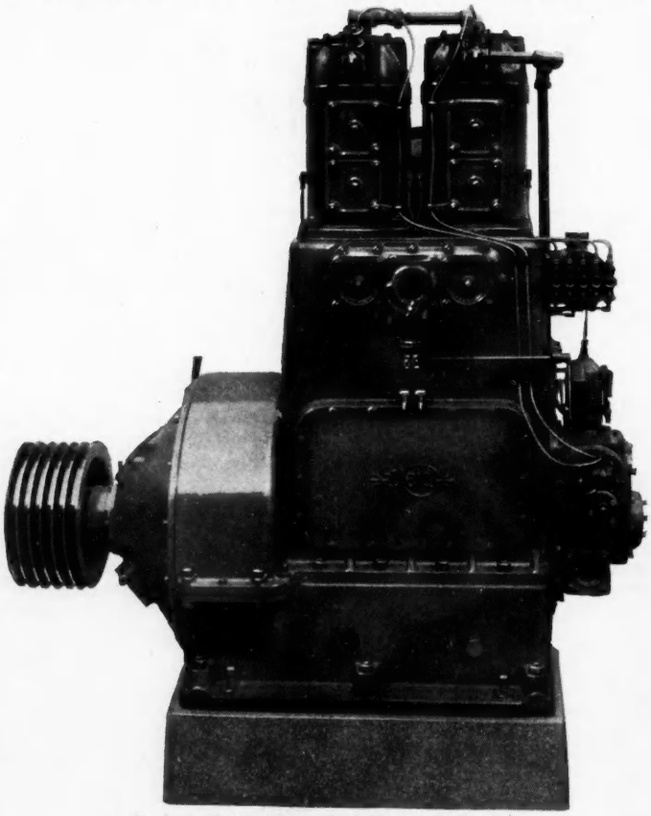
Johnson Safety Valve

VERTICAL GAS ENGINE

Joseph Reid Gas Engine Company

Joseph Reid Gas Engine Company, Oil City, Pennsylvania, recently announced the type V-2 7½ x 9½ inches twin-cylinder vertical gas engine as a new addition to its line of pumping engines.

This engine is of the two-cycle, cross-head type, and includes in its design many features of construction that have been thoroughly tested in the horizontal type engine. It is of rugged construction, with particular attention being paid to the accessibility of all working parts, while keeping the unit entirely enclosed and dust-proof.



Joseph Reid Type V-2 Twin Cylinder Vertical Gas Engine

Features of the design include: shell type, steel-backed babbitt-lined main bearings; three-bearing crankshaft; heavy flywheel to eliminate vibration; patented crosshead and piston-rod connection; nickel-content piston and combustion head; location of controls in one main assembly; built-in circulating water pump, and ample provision for lubrication.

This Week with the Industry's EQUIPMENT SUPPLIERS

Tompson Named General Manager Bethlehem Supply Corporation

Bethlehem Steel Corporation, Bethlehem, Pennsylvania, announces appointment of G. A. Tompson as executive vice president and general manager of its subsidiary, Bethlehem Supply Corporation. He succeeds H. P. Taubman, who has resigned as of December 1.

Tompson has been associated with Bethlehem Supply Corporation, Tulsa, Oklahoma, as vice president in charge of sales. Having attended the University of Missouri, he has been engaged in the oil supply business for 20 years.

GUY A. TOMPSON
Promoted by Bethlehem Supply Corporation

Culbertson in California for American Iron & Machine Company

American Iron & Machine Works Company, Oklahoma City, Oklahoma, announces appointment of Edw. A. Culbertson as California representative.

Culbertson has been with the company's office, located at Shreveport, Louisiana, for the past three years. His office will now be located at 934 North Alameda, Los Angeles.

Well Equipment Transfers Representatives

Well Equipment Manufacturing Corporation, Houston, announces the following changes in location of field representatives: E. L. Oliver has been moved from the Houston territory to Oklahoma City to cover the Oklahoma-Kansas division; Earl Grisson has been transferred from this upper Mid-Continent district to Corpus Christi, to cover the South Texas division, replacing Ralph Walker, who goes to Odessa in charge of the West Texas-New Mexico area. O. W. Sanders, now at Odessa, is being transferred to Tyler to cover East Texas.

Worthington Promotes W. C. Flanders

Worthington Pump and Machinery Corporation, Harrison, New Jersey, announces appointment of W. C. Flanders as sales manager. He will succeed G. H. Gleeson, formerly vice president in charge of sales, recently resigned.

Flanders started with the company 15 years ago as salesman in New Jersey, and for the past 2 years has been general representative in the northeastern section, traveling from Buffalo, New York, to Washington, D. C.

As secretary of the New Jersey Water Works Association, Flanders served that organization for five years until its absorption by the American Water Works Association a few months ago.

Covill Resigns as Representative for Northern Equipment

Northern Equipment Company, Erie, Pennsylvania, has accepted the resignation of Alden L. Covill, the company's Rochester representative since 1918, who is retiring from business. The Rochester territory will now be covered by Charles A. Randorf of Buffalo, New York, who has represented the company in the Buffalo area for the last 13 years, this representing an extension of his former territory.

Wilson Promoted by American Rolling Mill Company

The American Rolling Mill Company, Middleton, Ohio, announced appointment of Murray B. Wilson as manager of the company's New York sales district.

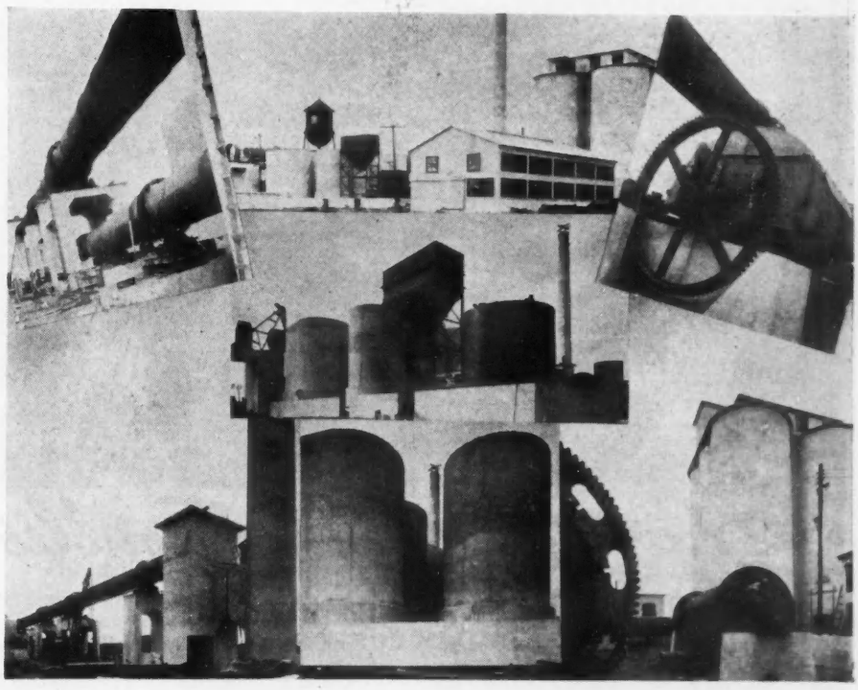
Following his graduation from Miami University, Oxford, Ohio, Wilson started as mill worker at the Middleton plant. He later was assigned to the home office sales division. Since 1927, he has been attached to the Detroit sales district office of the company.

He succeeds Cliff Spear, who was forced to curtail his activities because of continued ill health.

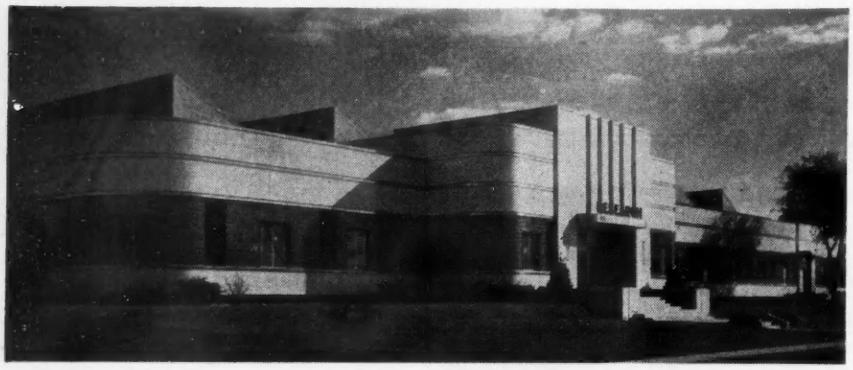
Gulf Portland Cement Plant Near Completion

Gulf Portland Cement Company, Houston, recently announced that its plant, located on the ship channel, will be completed and in production shortly after the first of the year.

Started in April, 1937, this is the only cement plant which has been built in the United States during the present year. All the latest methods and new developments in the industry have been employed in construction and equipment, and, according to the company, this plant is the most modern project built in recent years. When completed the plant will have a daily capacity of 3400 sacks of high grade Portland cement. The operation staff will consist of 35 highly trained specialists in cement blending and manufacturing.



Gulf Portland cement plant under construction in Houston; top left, 220-foot rotary kiln and rotary cooler below; top center, general view of new plant from ship channel slip; top right, showing installation of newly perfected Kominuter; center, detail view showing installation of lower end of rotary kiln, concrete blending tanks and shell hopper; lower left, dust chamber, stack and upper section of rotary kiln; lower center, detail view of blending tanks with stack in background; lower right, installation of tube mills used for grinding and pulverizing shell. Giant silos shown in the background.



American Rolling Mill Company's new laboratory

American Rolling Mill Company Completes New Laboratory

American Rolling Mill Company, Middleton, Ohio, recently completed its new research laboratories in Middleton, the dedication of which was attended by more than 200 scientists from all parts of the country.

The single-story research building has a frontage of 255 feet and a depth of 175 feet, providing 43,500 square feet of floor space. For the exterior facings, porcelain enameled panels are fastened to the wall sections with metal girt strips formed in the shape of a hook. The entire floor is concrete, covered with asphalt tile in the main office sections. All electric, telephone and other service lines have been placed underground in fibre ducts, which have been encased in the concrete floor. Ventilation and atmospheric conditions are controlled by two air-conditioning systems, one for the research staff offices and one for the testing shops and laboratories. There are 12 laboratories with complete facilities for specialized research, which include equipment for setting up tests to determine and maintain the quality of all Armco products.

Wilbur Smith Manager of McEnearney in Trinidad

W-K-M Company, Incorporated, 220 Roberts Street, Houston, recently announced that Wilbur Smith is manager of oil field equipment for Charles McEnearney Company, San Fernando, Trinidad, which has recently become Trinidad agents for W-K-M Company.

Get Rid of Coupling Troubles

WRITE FOR THIS NEW BULLETIN No. 63

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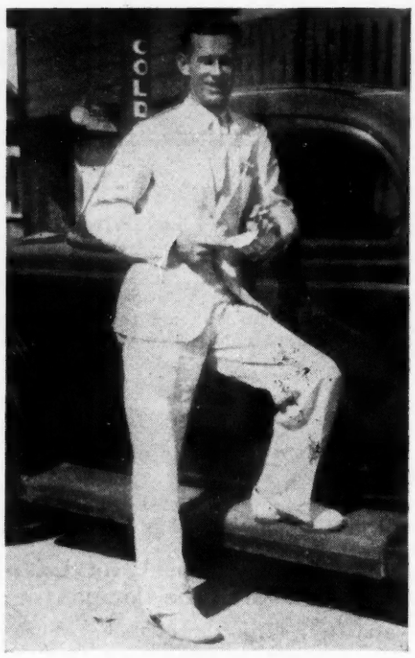

WILBUR SMITH

Muskat writes book on homogeneous fluid flow

"The Flow of Homogeneous Fluids Through Porous Media," an interesting 750-page book by M. Muskat, has been published by McGraw-Hill Book Company, New York, New York. The subject matter of this important treatise, while distinctly limited by the qualifications "homogeneous" and "porous," is nevertheless sufficiently wide in scope to find application in many branches of applied science. In such fields as ground-water hydrology, encompassing the provision and maintenance of water supplies, irrigation, and drainage problems, and petroleum engineering, involving the production of gas and oil from their underground reservoirs, the applications are evidently of basic importance.

In addition to the introduction, which itself is wide in scope, the volume contains chapters on Darcy's Law and the measurement of the permeability of porous media, general hydrodynamical equations for the flow of fluids through porous media, two-dimensional flow problems and potential-theory methods, three-dimensional problems, gravity-flow systems, systems of non-uniform permeability, two-fluid systems, multiple-well systems, the flow of compressible liquids through porous media, the flow of gases through porous media, and appendices.

The price of the book is $8.00, and may be purchased through Gulf Publishing Company, Houston.

Bearings

Timken Roller Bearing Company, Canton, Ohio, has just completed a revision of the general information section of the Timken Engineering Journal.

The data presented in this 294-page loose-leaf volume covers a general discussion of the design and types of bearings now available, a discussion of ratings and bearing selection, methods used for caluculating bearing loads for a wide range of applications, and complete information as to bearing sizes and load carrying capacity.

Squeaks from the Bull Wheel

Suspicious

The justice of the peace recalled a witness. "My man," he said sternly, "you may find yourself committed for perjury. You told the court just now you had only one brother, but your sister has sworn she has two. Now, which is the truth?"

Choice

"Remember, my boy, that wealth does not bring happiness."

"I don't expect it to, I merely want it so that I may be able to choose the kind of misery that is most agreeable to me."

Give Up?

In a civil service examination given in New York City some time ago, one of the questions asked was the following:

"If a man buys an article for $12.25 and sells it for $9.75, does he gain or lose by the transaction?"

One of our modern young sweet things, probably with good looks unmarred by brains, after studying for a while, is said to have given the following answer:

"He gains on the cents, but loses on the dollars."—Ten-Point.

There's Ranks and Ranks

"So your husband is an army officer, Clara? What rank?"

"Well, he's only a corporal now, but he's been incited twice for bravery and next week he goes into the hospital for a major operation."

Out of the Bag

"Madame, that child is over five years old and he will have to pay full fare."

"But I've only been married four."

"Never mind the true confessions; all I want is the money."

Better Yet

A man went into Abe's book store and asked for a copy of "Who's Who and What's What," by Jerome K. Jerome.

"Haven't got dot book," said Abe, "but ve haf 'Who's He and Vot's He Got,' by Bradstreet."

Methods

I certainly have been pinched for money lately.

What a strange way of getting it. My wife kisses me when she wants money.

No Worry

"And will the operation be dangerous, doctor?"

"Nonsense. You couldn't buy a dangerous operation for forty dollars."

Misfits

Boss: "What's the idea of throwing those shoes away?"

Swedish Clerk: "They bane no gude. I try them on six fellers and they don't fit anyone."

After the Party

"Well, old man, how did you get along after I left you—get home all right?"

"No, a confounded policeman took me to the station, where I had to spend the night."

"You were lucky. I got home."

Agreeable Food

"Look here, my man, why do you always come to my house to beg?"

"Doctor's orders, madam."

"Doctor's orders?"

"He told me that when I found food that agreed with me I should stick to it."

Soft

"I sell underthings to nudist colonies."

"What kind of underthings do nudists need?"

"Cushions."

Good Start

"Now that we are married perhaps I might venture to point out a few of your little defects."

"Don't bother, dear, I'm quite aware of them. Those little defects prevented me from getting a much better man than you are."

Technical

The chemist had had a scene with his wife, who finally broke down crying. Whereupon he ejaculated:

"Stop crying! Your tears have no effect on me. What are they? A small percentage of phosphorus salts, a little sodium chloride. All the rest—water. Bah!"

More Refined

A rich man in his years of toil,
Burnt barrels and barrels of midnight oil;
His son now keeps his memory green
By burning midnight gasoline.

Poetry and Prose

"I read in a book that Apollo was chasing a nymph and she turned into a tree."

"He was lucky. Those I chase always turn into a night club or a restaurant."

Cruelty to the Scotch

The origin of the bagpipe was being discussed, the representatives of different nations eagerly disclaiming responsibility for the atrocity. Finally an Irishman said: "Well, I'll tell you the truth about it. The Irish invented it and sold it to the Scotch as a joke; and the Scotch ain't seen the joke yet."

Two Sizes Larger

"Heard the latest news about Newrich?"

"No—what now?"

"He bought a Louis XIV bed, but it was too small for him, so he sent it back and asked for a Louis XVI."

Taking No Chances

A clergyman, who was summoned in haste by a woman taken suddenly ill, answered the call though somewhat puzzled, for he knew that she was not of his parish and was, moreover, known to be a devoted worker in another church. While he was waiting to be shown to the sick room he fell to talking to the little girl of the house.

"It is very gratifying to know that your mother thought of me in her illness," said he. "Is your minister out of town?"

"Oh, no," answered the child in a matter-of-fact tone. "He's home. Only we thought it might be something contagious—and we didn't want to take any risks!"

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